

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

ALLEGHENY COUNTY EMPLOYEES'
RETIREMENT SYSTEM, EMPLOYEES'
RETIREMENT SYSTEM OF THE CITY
OF BATON ROUGE AND PARISH OF
EAST BATON ROUGE, DENVER
EMPLOYEES RETIREMENT PLAN,
INTERNATIONAL ASSOCIATION OF
MACHINISTS AND AEROSPACE
WORKERS NATIONAL PENSION
FUND, and IOWA PUBLIC
EMPLOYEES' RETIREMENT SYSTEM,
Individually and On Behalf of All Others
Similarly Situated,

Plaintiffs,

v.

ENERGY TRANSFER LP, KELCY L.
WARREN, THOMAS E. LONG,
MARSHALL MCCREA, and MATTHEW
S. RAMSEY,

Defendants.

Case No. 2:20-cv-00200-GAM

EXPERT REPORT OF CHAD COFFMAN, CFA

September 17, 2021

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I. INTRODUCTION

1. I, Chad Coffman, am the President of Global Economics Group, a Chicago-based firm that specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including, as here, in the context of securities litigation. I have been asked by counsel for the Lead Plaintiffs in this matter to examine and opine on whether the market for Energy Transfer LP (“Energy Transfer” or the “Company”) common units (“Energy Transfer Common Units”) was efficient during the period from February 25, 2017 through December 2, 2019, inclusive (the “Class Period”).¹ In addition, I have been asked to opine on whether calculating damages in this action is subject to a common methodology under Section 10(b) of the Securities Exchange Act of 1934 (the “Exchange Act”) and SEC Rule 10b-5 adopted thereunder (collectively “Section 10(b)").

2. The materials I have considered in forming my opinions are summarized in **Appendix A**. Global Economics Group is being compensated at an hourly rate of \$900 per hour for my work on this matter, and at rates between \$200 and \$450 for members of my staff who performed work in connection with this report under my direction and supervision. My compensation is in no way contingent on the outcome of this case. My qualifications are described below.

II. QUALIFICATIONS

3. I hold a Bachelor’s Degree in Economics with Honors from Knox College and a Master’s of Public Policy from the University of Chicago. I am also a CFA charter-holder. The CFA, or Chartered Financial Analyst, designation is awarded to those who have sufficient

¹ Operative Class Action Complaint for Violation of the Federal Securities Laws, June 15, 2020, in *Allegheny County Employees Retirement System et al. v. Energy Transfer LP et al.*, No. 2:20-cv-00200-GAM (“Complaint”) p. 1.

practical experience and complete a rigorous series of three examinations over three years that cover a wide variety of financial topics including financial statement analysis and valuation.

4. I, along with several others, founded Global Economics Group on March 25, 2008.² Prior to starting Global Economics Group, I was employed by Chicago Partners LLC for over twelve years where I was responsible for conducting and managing analysis in a wide variety of areas including securities valuation and damages, labor discrimination, and antitrust. I have been engaged numerous times as a valuation expert both within and outside the litigation context. My experience in class action securities cases includes work for plaintiffs, defendants, D&O insurers, and a prominent mediator (Retired Judge Daniel Weinstein) to provide economic analysis and opinions in dozens of securities class actions as well as other matters. As a result of my involvement in these cases, much of my career has been spent analyzing and making inferences about how quickly and reliably, and to what degree, new information impacts securities prices.

5. My qualifications are further detailed in my curriculum vitae, which is attached as **Appendix B**.

III. SUMMARY OF OPINIONS

6. After analyzing Energy Transfer's Common Units during the Class Period and giving careful consideration to the efficiency factors described in detail throughout this report, I have formed the opinion that the market for Energy Transfer's Common Units was efficient during the Class Period.

² Prior to March 16, 2011, Global Economics Group was known as Winnemac Consulting, LLC.

7. I have also formed the opinion that damages in this action can be calculated on a class-wide basis using a common methodology. These opinions are based upon my analysis described below.

8. The remainder of this report is organized as follows: **Section IV** of this report provides an overview of Energy Transfer’s business operations and the allegations in this case. **Section V** discusses the reliance requirement for the claims under Section 10(b) of the Exchange Act and the “fraud on the market” theory. **Section VI** introduces the *Cammer* factors and other factors that financial economists and courts apply when evaluating market efficiency under the “fraud on the market” theory. **Section VII** provides the results of my empirical evaluation of each *Cammer* factor and other factors for Energy Transfer’s Common Units during the Class Period. **Section VIII** addresses how damages in this matter are subject to a common approach and methodology that can be applied class-wide. Finally, **Section IX** offers my conclusions.

9. I reserve the right to amend this report, including to reflect new information that becomes available to me, including in light of the discovery process and/or future rulings from the Court.

IV. OVERVIEW OF THE COMPANY AND ALLEGATIONS

10. Energy Transfer is a limited partnership³ that owns subsidiaries that conduct natural gas operations; crude oil, NGL and refined products transportation; terminalling services and acquisition and marketing activities; and NGL storage and fractionation services.⁴ Energy Transfer described its business during the Class Period as follows:

³ A Master Limited Partnership (MLP) is a publicly traded partnership. The nature of the partnership facilitates the “pass through” of income to its partners. This essentially avoids double corporate taxation on profits. Ownership interests in MLPs are referred to as “units.” Investors who own MLP units are considered limited partners of the partnership. *See*, <https://www.energytransfer.com/investor-faq/>.

⁴ Energy Transfer SEC Form 10-K for the fiscal year ended December 31, 2019, p. 1.

The primary activities in which we are engaged, which are in the United States and Canada, and the operating subsidiaries through which we conduct those activities are as follows:

- natural gas operations, including the following: natural gas midstream and intrastate transportation and storage; interstate natural gas transportation and storage; and
- crude oil, NGL and refined products transportation, terminalling services and acquisition and marketing activities, as well as NGL storage and fractionation services.

In addition, we own investments in other businesses, including Sunoco LP and USAC, both of which are publicly traded master limited partnerships.⁵

11. For the fiscal year ended December 2019, Energy Transfer reported revenue of \$54.21 billion, operating income of \$7.28 billion, and listed total assets of \$98.88 billion.⁶ As of December 31, 2019, Energy Transfer employed approximately 12,812 employees⁷ and its Common Units traded on the New York Stock Exchange (“NYSE”) under the ticker “ET.”^{8,9}

12. Lead Plaintiffs’ Complaint alleges that Energy Transfer and the Individual Defendants^{10,11} issued materially false and misleading statements and omitted material information from investors during the Class Period, ultimately causing damages to purchasers of Energy Transfer Common Units who unknowingly bought Energy Transfer Common Units at

⁵ Energy Transfer SEC Form 10-K for the fiscal year ended December 31, 2019, p. 1.

⁶ Energy Transfer SEC Form 10-K for the fiscal year ended December 31, 2019, p. 75.

⁷ Energy Transfer SEC Form 10-K for the fiscal year ended December 31, 2019, p. 33.

⁸ Energy Transfer SEC Form 10-K for the fiscal year ended December 31, 2019, p. 1.

⁹ Energy Transfer units can easily be purchased through your banker, broker or other financial institution or brokerage house. Energy Transfer does not have a direct purchase plan. *See*, <https://www.energytransfer.com/investor-faq/>.

¹⁰ Complaint ¶¶33-37.

¹¹ The Individual Defendants are Energy Transfer’s CEO and Chairman, Kelcy L. Warren; Energy Transfer’s CFO and Director, Thomas E. Long; Energy Transfer’s President and CCO, Marshall McCrea; and Energy Transfer’s COO, Matthew S. Ramsey. *See*, Complaint ¶¶40, 42-44; Memorandum and Order dated April 6, 2021, ECF Nos. 64 and 65.

artificially inflated prices and were damaged when the unit price ultimately reflected the concealed information.¹²

13. More specifically, the claims at issue in this case concern Defendants’ alleged materially false and misleading statements regarding the construction of the Revolution, Mariner East and Mariner East 2X pipelines. Lead Plaintiffs’ Complaint alleges that Defendants made false and misleading statements about, among other things, Energy Transfer’s misconduct in obtaining the pipeline permits, problems with construction of the pipelines, the safety of construction for residents living near where it was occurring, and the in-service dates and throughputs of the pipeline projects.¹³ The Complaint alleges that, through a series of corrective disclosures, the market finally learned the truth about these subjects and Energy Transfer’s fraudulent scheme, and that, as the truth was revealed, the price of Energy Transfer Common Units fell—harming investors who had purchased Energy Transfer Common Units during the Class Period at inflated prices.¹⁴

V. DISCUSSION OF RELIANCE ELEMENT

14. Class members’ reliance on the alleged material misstatements and omissions is a required element for Lead Plaintiffs’ Section 10(b) claims. Lead Plaintiffs assert the fraud on the market theory of reliance in this matter.¹⁵ The “fraud on the market” theory is based on the fact that, in an efficient market (*i.e.*, one in which widely-disseminated public information is quickly incorporated into the market price of a security), all purchasers of a security implicitly rely on any material misrepresentations or omissions, since the value of those misrepresentations or

¹² Complaint ¶38.

¹³ Complaint ¶¶ 3-19.

¹⁴ Complaint ¶¶20-28.

¹⁵ Complaint ¶473.

omissions is incorporated into the security's purchase price. The "fraud on the market" theory was first addressed by the U.S. Supreme Court in *Basic Inc. v. Levinson*:

... [I]n an open and developed securities market, the price of a company's stock is determined by the available material information regarding the company and its business...Misleading statements will therefore defraud purchasers of stock even if the purchasers do not directly rely on the misstatements...The causal connection between the defendants' fraud and the plaintiffs' purchase of stock in such a case is no less significant than in a case of direct reliance on misrepresentations.¹⁶

15. The Supreme Court reaffirmed this theory in *Halliburton II*:

More than 25 years ago, we held that plaintiffs could satisfy the reliance element of the Rule 10b-5 cause of action by invoking a presumption that a public, material misrepresentation will distort the price of stock traded in an efficient market, and that anyone who purchases the stock at the market price may be considered to have done so in reliance on the misrepresentation. We adhere to that decision and decline to modify the prerequisites for invoking the presumption of reliance.¹⁷

16. As indicated in *Basic* and reaffirmed in *Halliburton II*, in an open, developed and efficient market, market prices reflect what is publicly known about a company. In an efficient market, if a company provides the market with materially misleading information (such as materially misleading information regarding its financial strength or business practices or prospects), the market price of securities like common stock or common units will be inflated (or deflated) compared to what the price would have been if the truth were known. Thus, in an efficient market, where the plaintiffs assert there were material misrepresentations or omissions, all purchasers implicitly relied on those misrepresentations and/or lack of disclosure by paying the inflated (or deflated) price.

17. Determining whether the market for a security was "open and developed" or "efficient" to the degree required for a presumption of reliance under the "fraud on the market"

¹⁶ *Basic Inc. v. Levinson*, 485 U.S. 224, 241-42 (1988) ("*Basic*").

¹⁷ *Halliburton Co. v. Erica P. John Fund, Inc.*, 134 S. Ct. 2398, 2417 (2014) ("*Halliburton II*").

theory is an empirical exercise.¹⁸ The esteemed economist Dr. Eugene Fama, in his seminal research, first outlined definitions of an “efficient market.”¹⁹ He described different levels of efficiency which he called “weak-form,” “semi-strong-form,” and “strong-form” efficiency.²⁰

18. The market efficiency standard adopted by *Basic* and reaffirmed by *Halliburton II* as necessary for the presumption of reliance conforms most closely with Dr. Fama’s “semi-strong form” efficiency. “Semi-strong form” efficiency implies that all publicly available information is reflected in a security’s current market price. This in turn implies that security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. The Supreme Court stated in *Basic*: “In an open and developed securities market, the price of a company’s stock is determined by the available material information regarding the company and its business.”²¹ The Supreme Court’s effective adoption of the “semi-strong form” efficiency standard is economically sensible because it recognizes that insiders often possess non-public information and that

¹⁸ To recognize the presumption of reliance, the *Basic* Court explained, was not “conclusively to adopt any particular theory of how quickly and completely publicly available information is reflected in market price.” *Basic*, 485 U.S. at 248 n.28. The *Basic* Court instead based the presumption on the fairly modest premise that “market professionals generally consider most publicly announced material statements about companies, thereby affecting stock market prices.” *Basic*, 485 U.S. at 246 n.24. *Basic*’s presumption of reliance thus does not rest on a “binary” view of market efficiency. Rather, market efficiency is seen as a matter of degree or as running along a market efficiency spectrum.

¹⁹ Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383 (1970).

²⁰ “Weak-form” efficiency requires that historical prices are not predictive of future prices. Under this form of efficiency, excess returns cannot be earned using strategies based on historical prices. Therefore, technical analysis will not produce consistent excess returns over time. “Semi-strong form” efficiency implies that all public information is reflected in a stock’s current market price. Security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. Under this form of efficiency, neither fundamental nor technical analysis can produce consistent excess returns. “Strong-form” efficiency implies all information in the market, whether public or private, is accounted for in the market price. In this market, investors cannot consistently earn excess returns over a long period of time even if they have inside information.

²¹ *Basic*, 485 U.S. at 241.

securities prices do not necessarily reflect this non-public information, but that to presume reliance, the market price must reflect publicly available information.

19. In the next section, I explain the factors that are regularly considered by financial economists and courts in determining whether the market for a particular security is efficient.

VI. CAMMER FACTORS AND OTHER FACTORS RELEVANT TO MARKET EFFICIENCY

20. In *Cammer v. Bloom*, the court identified the following factors as relevant to the determination of whether an efficient market exists for a given security: 1) average weekly trading volume, 2) analyst coverage, 3) market makers, 4) SEC Form S-3 eligibility, and 5) price reaction to unexpected information.²²

21. The *Cammer* decision relied on Bromberg & Lowenfels' definition of efficiency. As articulated below, the adopted definition of efficiency is consistent with Fama's definition of "semi-strong" efficiency. For the purposes of this exercise, I adopt Bromberg & Lowenfels' definitions for the terms "open," "developed," and "efficient" as described below:

An open market is one in which anyone, or at least a large number of persons, can buy or sell.

A developed market is one which has a relatively high level of activity and frequency, and for which trading information (e.g., price and volume) is widely available. It is principally a secondary market in outstanding securities. It usually, but not necessarily, has continuity and liquidity (the ability to absorb a reasonable amount of trading with relatively small price changes).

An efficient market is one which rapidly reflects new information in price.

These terms are cumulative in the sense that a developed market will almost always be an open one. And an efficient market will almost invariably be a developed one.²³

²² *Cammer, v. Bloom*, 711 F. Supp. 1264 (D.N.J. 1989) ("*Cammer*").

²³ *Cammer*, 711 F. Supp. at 1276 n.17 (citing Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud*, § 8.6 (Aug. 1988) ("Bromberg & Lowenfels")) (emphasis added).

22. While there is a well-accepted economic theory of market efficiency, there are no broadly accepted bright-line empirical tests that allow one to classify a particular market as “efficient” or “inefficient.” In my view, the *Cammer* decision identified important metrics to consider when evaluating efficiency for purposes of the “fraud on the market” theory. I also consider a number of other factors that courts have utilized beyond the *Cammer* factors. However, since there are no bright-line tests for efficiency, it is important to consider the identified efficiency factors as a whole because none of the individual tests or metrics is determinative as to whether a particular market is efficient.

23. In addition to the five *Cammer* factors, I also evaluate, in subsequent sections, the three widely-recognized *Krogman* factors in order to further examine the efficiency of the market for Energy Transfer Common Units during the Class Period.²⁴ The *Krogman* factors are: 1) the company’s market capitalization, 2) the common units’ bid-ask spread, and 3) the percentage of units not held by insiders (the “float”). Finally, in subsequent sections, I also consider three additional factors to assess market efficiency during the Class Period: 1) the amount of institutional ownership of Energy Transfer Common Units, 2) autocorrelation (meaning whether there is a pattern in a security’s returns such that future returns can be predicted based upon past returns), and 3) options trading. Consideration of these three factors can provide additional evidence of market efficiency (or inefficiency), alongside the *Cammer* and *Krogman* factors.

²⁴ *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001).

VII. APPLICATION OF EFFICIENCY FACTORS TO ENERGY TRANSFER COMMON UNITS

A. OVERVIEW

24. After giving careful consideration to each of the efficiency factors described in detail below, I find that each factor supports the conclusion that the market for Energy Transfer Common Units was efficient throughout the Class Period. In addition to the discussion below, **Exhibit 1** summarizes how, for each of the factors examined, the empirical evidence supports a finding that Energy Transfer Common Units traded in an efficient market. As further background to my analyses, **Exhibit 2** displays Energy Transfer Common Units' closing price and trading volume for each day throughout the Class Period.

25. In summary, and as discussed more fully below, Energy Transfer Common Units traded in an efficient market during the Class Period. First, the average weekly trading volume of Energy Transfer Common Units during the Class Period far exceeded benchmarks that courts have established. During the Class Period, the average weekly trading volume for Energy Transfer Common Units was 40.2 million units, which represents 2.38% of units outstanding, higher than the average security traded on the New York Stock Exchange ("NYSE") and/or NASDAQ. Second, numerous securities analysts followed and reported on Energy Transfer during the Class Period. Third, Energy Transfer Common Units were actively traded on the NYSE, thus fulfilling the *Cammer* factor regarding market makers. Fourth, Energy Transfer filed Form S-3s, S-3/As, and S-3ASRs before and during the Class Period. Fifth, there was a strong cause-and-effect relationship between new Company-specific information and the market price of Energy Transfer Common Units during the Class Period. Sixth, Energy Transfer Common Units had a large market capitalization. Seventh, Energy Transfer Common Units had a low bid-ask spread relative to exchange-traded common stocks. Eighth, insider holdings were low while

institutional ownership was high during the Class Period. Ninth, the autocorrelation coefficient was far from statistically significant at even the 90% confidence level for the Class Period. Finally, there was active trading in Energy Transfer options throughout the Class Period. My analyses of all of these factors support the conclusion that Energy Transfer Common Units traded in an open, developed, and efficient market at all relevant times during the Class Period.

B. CAMMER FACTOR 1: AVERAGE WEEKLY TRADING VOLUME

26. The first *Cammer* factor is the average weekly trading volume of a security.

According to one authority cited by the *Cammer* court,

Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for the security is an efficient one; 1% would justify a substantial presumption.²⁵

27. Volume as a fraction of shares outstanding is an important indicator of market efficiency. First, volume is objectively quantifiable and comparable across securities. Second, high volume is generally indicative of continuity, liquidity, and market depth – which are highly indicative of market efficiency.²⁶ Third, substantial volume would indicate there is likely a market for the collection and distribution of information about the security. As Thomas and Cotter explain, “[t]rading volume was also considered as an eligibility standard because it affects

²⁵ *Cammer*, 711 F. Supp. at 1293 (citing Bromberg & Lowenfels).

²⁶ Continuity means that trades may occur at any time. Liquidity in this context means that investors can convert cash into shares or shares into cash at a price similar to that of the prior trade (assuming no new information). William Sharpe, Gordon J. Alexander & Jeffrey W. Bailey, *Investments*, Prentice Hall, 44-45 (5th ed. 1995).

Bromberg and Lowenfels define a market that has continuity and liquidity as “the ability to absorb a reasonable amount of trading with relatively small price changes.” *Cammer*, 711 F. Supp. at 1276 n.17 (citing Bromberg & Lowenfels).

Market depth refers to “the number of shares that [can] be traded at the quoted bid and ask prices.” A deep market will have significant orders on the buy and sell side so that the market can experience a relatively large market order without greatly altering the market price. See Amihud, Y., et al., *Liquidity and Asset Prices*, 1 FOUND. & TRENDS FIN. 269 (2005), 317.

information dissemination to the market, and was an important criterion for investment analysts in deciding which stocks to follow.”²⁷

28. Energy Transfer Common Units easily surpass the threshold level of average weekly trading volume necessary for an efficient market. The average weekly trading volume for Energy Transfer Common Units during the Class Period was 2.38% of units outstanding, compared to 1.93% for the NYSE and NASDAQ. Based on this figure, the weekly trading volume for Energy Transfer Common Units far exceeds the 1% or 2% threshold cited by *Cammer*.²⁸ **Exhibit 3** plots Energy Transfer Common Units’ trading volume as a fraction of units outstanding for each week during the Class Period.²⁹ Indeed, the average weekly trading volume for Energy Transfer Common Units during the Class Period was 40.2 million units. This volume of trading supports the conclusion that the market for this security was efficient throughout the Class Period.

29. Another way to measure trading volume is annualized turnover velocity, which is essentially the first *Cammer* factor expressed in dollar terms.³⁰ Specifically, instead of looking at shares traded divided by shares outstanding, turnover velocity is the dollar value of shares traded (*i.e.*, shares traded multiplied by price per share) divided by the dollar value of all shares outstanding (*i.e.*, shares outstanding multiplied by price per share). This is the same ratio because the numerator and denominator are each multiplied by price per share. The advantage of this

²⁷ Randall S. Thomas & James F. Cotter, *Measuring Securities Market Efficiency in the Regulatory Setting*, 63 LAW & CONTEMP. PROBS. 105, 108 (2000).

²⁸ *Cammer* 711 F. Supp. at 1293-94 (D.N.J. 1989).

²⁹ For the purposes of this analysis, a “trading week” consists of 5 consecutive trading days, which may not follow the calendar week.

³⁰ Turnover velocity is simply the average trading volume as a percentage of shares outstanding (the first *Cammer* Factor) expressed in dollar terms:

Turnover Velocity Ratio = (Volume x Price)/(Shares Outstanding x Price) = Dollars Traded/Dollars Outstanding.

measure is that, once quoted in annualized terms, Energy Transfer's Common Units' turnover velocity can be compared directly with those of other publicly traded stocks based on exchange-reported statistics.

30. For example, over the Class Period, the annualized turnover velocity for Energy Transfer's Common Units was 118.97%, as compared with the NYSE and NASDAQ average of 100.86% over the same period.³¹ Thus, Energy Transfer Common Units had an average annualized turnover velocity that was substantially higher than that of the average stock trading on the NYSE and NASDAQ, further supporting that it traded in an efficient market.

31. In short, the relatively high trading volume in Energy Transfer Common Units throughout the Class Period supports the conclusion that the market for Energy Transfer Common Units was efficient.

C. CAMMER FACTOR 2: ANALYST COVERAGE

32. The *Cammer* decision stated the following related to analyst coverage:

... [I]t would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors.³²

33. Analyst coverage can be important evidence of efficiency. Significant analyst coverage implies that there is sufficient interest in a company and its securities, that there is an active market for information regarding the company and its securities, and that the information is widely distributed.

³¹ Turnover velocity for the NYSE and NASDAQ is calculated from data provided by the World Federation of Exchanges. See <https://www.world-exchanges.org/home/index.php/statistics/monthly-reports>.

³² *Cammer*, 711 F. Supp. at 1286.

34. During the Class Period, there was an abundance of analyst coverage for Energy Transfer. **Exhibit 4** shows that there were at least 224 reports issued during the Class Period and 16 separate firms that had equity analysts issue reports on Energy Transfer, including major firms such as Jefferies, UBS, and Credit Suisse.³³ These reports served the purpose of disseminating publicly available information along with commentary, news, updates, analyses, and recommendations of the analysts to investors. Additionally, analysts from major firms, such as Mizuho Securities USA LLC, Bank of America Merrill Lynch, and Raymond James & Associates, participated on earnings conference calls throughout the Class Period.³⁴ The extensive coverage of Energy Transfer by securities analysts supports the conclusion that Energy Transfer Common Units traded in an efficient market throughout the Class Period.

35. Since 1989, when the *Cammer* decision was rendered, there has been an increase in alternative methods by which publicly-available information about publicly-traded securities is disseminated to investors. For example, since the *Cammer* decision, through the Internet, 24-hour cable news networks, email, RSS feeds,³⁵ and other media, the ability of individual and institutional investors to obtain information about publicly-traded securities and the market in general has revolutionized the manner in which investors and investment professionals receive and process information.

36. Moreover, information regarding the market price, the current bid-ask spread, and the ability to trade online is available almost instantaneously via the Internet for anyone with an

³³ I obtained Energy Transfer analyst reports from Counsel. I also observed a collection of reports from Seeking Alpha, an investor-based website. The number of analyst reports I identify is likely understated. For example, it is clear that analysts from Citigroup Inc. and Raymond James & Associates participated on earnings conference calls during the Class Period, but I did not have access to research reports of those firms through Investext in connection with preparing this report. (See, “FQ1 2017 Earnings Call Transcripts,” *S&P Capital IQ*, May 4, 2017).

³⁴ See, e.g., “FQ1 2018 Earnings Call Transcripts,” *S&P Capital IQ*, May 10, 2018.

³⁵ RSS feeds provide content summaries of news, blogs, forums or website content.

online brokerage account. Thus, in addition to the substantial analyst coverage of Energy Transfer, there were many other sources of public information dissemination. For example, there was substantial public press regarding Energy Transfer. A search for articles classified as related to Energy Transfer by Factiva over the Class Period resulted in 4,054 unique articles.³⁶ In addition, there were numerous SEC filings available online at the SEC EDGAR search database at no cost, as well as various other sources of public information available throughout the Class Period that I do not attempt to quantify. The degree of news coverage and publicly available information further supports the conclusion that there was substantial supply of, and demand for, information regarding Energy Transfer in the public arena throughout the Class Period.

37. In summary, the number of analyst reports and the substantial public dissemination of news and other information regarding Energy Transfer provides evidence of a robust and active market for public information about the Company and evidence that Energy Transfer Common Units traded in an efficient market during the Class Period.

D. CAMMER FACTOR 3: MARKET MAKERS

38. A market maker is a firm that is ready to buy or sell a particular stock on a regular and continuous basis.³⁷ The third *Cammer* factor states:

For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would

³⁶ Factiva is a business information and research tool owned by Dow Jones & Company. Factiva aggregates content from both licensed and free sources, and provides organizations with search, alerting, dissemination, and other information management capabilities. I first identified 4,054 unique articles as a result of two searches: 1) one search for “All Sources” with the company field “Energy Transfer LP” and the keyword field “Energy Transfer Equity”, and 2) a separate search for “All Sources” with the company field “Energy Transfer LP” and the keyword field “Energy Transfer LP”. The first search was conducted for the period “February 25, 2017 – October 18, 2018, and the second search for the period “October 19, 2018 – December 2, 2019. Duplicate articles have been removed by a proprietary function accessible in Factiva’s search builder. I acknowledge that this may not reflect all news as the Factiva database is limited to certain sources and content type.

³⁷ See <http://www.sec.gov/answers/mktmaker.htm>.

justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption.³⁸

39. The premise that the number of market makers can serve as an efficiency criterion relates to the notion that market makers are:

... [P]resumably knowledgeable about the issuing company and the stocks' supply and demand conditions (i.e., the "order flow"). Therefore, it is believed the larger the number of market makers in a given security, the more information is available about it and the quicker its dissemination in the price.³⁹

40. Energy Transfer Common Units traded on a major exchange (*i.e.*, the NYSE) with continuous public price and volume reporting, as opposed to an over-the-counter market without volume reporting, which is the context in which *Cammer* indicated this was a relevant criterion.⁴⁰

On such over-the-counter markets, there may be reason for concern regarding liquidity and information dissemination. However, these concerns are generally not applicable to stocks trading on large, modern exchanges such as the NYSE and NASDAQ, which are presumed to be efficient, report volume and trade details, and tend to have rules that virtually guarantee a liquid market.⁴¹

41. The NYSE and NASDAQ are two of the largest and most liquid security exchanges in the world with billions of shares traded each day. Unlike over-the-counter markets that rely on decentralized market makers providing liquidity for trading, the NYSE and NASDAQ rely on a

³⁸ *Cammer*, 711 F. Supp. at 1293.

³⁹ Barber, B., et al., The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency, 19 J. CORP. L. 285 (1994), 291.

⁴⁰ See *Cammer*, 711 F. Supp. at 1292, citing Bromberg & Lowenfels: "We think that, at a minimum, there should be a presumption – probably conditional for class determination – that certain markets are developed and efficient for virtually all the securities traded there: the New York and American Stock Exchanges, the Chicago Board Options Exchange and the NASDAQ National Market System."

⁴¹ For example, there are rules for minimal market capitalization and specialists are *required* to maintain an orderly market; see *Section 102* <http://wallstreet.cch.com/LCM/Sections/>. See also, William Sharpe, Gordon J. Alexander & Jeffrey W. Bailey, *Investments*, Prentice Hall, 45-53 (5th ed. 1995); Frank J. Fabozzi, Franco Modigliani & Frank J. Jones, *Foundations of Financial Markets and Institutions*, Prentice Hall, Chapter 18 – Appendix A (4th ed. 2010).

computerized system to match orders and provide quotes.⁴² The minimum requirements for a security to be listed on the NYSE or NASDAQ and remain in good standing virtually guarantee a liquid market for that security, irrespective of the number of “market makers” for that security.

42. Nevertheless, according to Bloomberg, throughout the Class Period, there were 122 market makers, such as UBS, Citi, and BMO Capital Markets, for Energy Transfer Common Units.⁴³ Therefore, Energy Transfer Common Units easily meet both the letter and spirit of this factor, further supporting the efficiency of the market during the Class Period.

E. CAMMER FACTOR 4: SEC FORM S-3 ELIGIBILITY

43. The fourth *Cammer* factor is SEC Form S-3 eligibility, which states,

...[I]t would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency.⁴⁴

44. SEC Form S-3 allows certain companies that have previously provided sufficiently high levels of public information to incorporate prior SEC filings by reference into current filings and not repeat the information, since it is already deemed to be widely publicly available.⁴⁵ A Form S-3 allows a company to register unspecified amounts of different specified types of securities using a single form. In order to be eligible to issue a Form S-3, among other things, a company 1) must be subject to the Securities Exchange Act of 1934 reporting requirements for more than one year, 2) must have filed all documents in a timely manner for the past twelve

⁴² For NYSE, *see* <https://www.nyse.com/market-model>. For NASDAQ, *see* <https://www.nasdaqtrader.com/Trader.aspx?id=TradingUSEquities>.

⁴³ Bloomberg RANK function.

⁴⁴ *Cammer*, 711 F. Supp. at 1287.

⁴⁵ For additional information, *see* www.sec.gov/about/forms/forms-3.pdf.

months, and 3) must show that it has not failed to pay dividends or sinking funds nor defaulted on debts or material leases. Eligibility to file a Form S-3 is confirmatory evidence of efficiency, not a requirement.

45. Energy Transfer filed Forms S-3, S-3/A, and S-3ASR before and during the Class Period, on February 6, 2017, February 8, 2017, February 28, 2017, and March 3, 2017.⁴⁶ Moreover, I have found no evidence that Energy Transfer was not S-3 eligible throughout the Class Period. Therefore, Energy Transfer meets this *Cammer* efficiency factor, which supports the conclusion that Energy Transfer Common Units traded in an efficient market.

F. CAMMER FACTOR 5: PRICE REACTION TO NEW INFORMATION

46. The fifth *Cammer* factor relates to how the price of a security reacts to new, company-specific information, and states:

... [O]ne of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price.⁴⁷

47. Establishing a causal connection between new company-specific events and movements in the market price is convincing evidence of market efficiency. A well-accepted technique often relied upon, both inside and outside of the context of litigation, to establish such a causal connection is called an “event study.” Indeed, academics used event studies as one tool for evaluating the efficient market hypothesis in the first place. Event studies have been used for over 40 years and have appeared in hundreds if not thousands of academic articles as scientific evidence in evaluating how new information affects securities prices.⁴⁸

⁴⁶ https://www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0001276187&type=S-3&dateb=20191231&owner=include&count=100&search_text=.

⁴⁷ *Cammer*, 711 F. Supp. 1291.

⁴⁸ John J. Binder, *The Event Study Methodology Since 1969*, 11 REV. QUANTITATIVE FIN. & ACCT., 111 (1998).

48. An event study is a well-accepted statistical method used to measure the effect of new information on the market prices of a company's publicly traded securities.⁴⁹ New information may include, for example, company press releases, earnings reports, SEC filings, and news reports or analyst reports. An event study is conducted by specifying a model of expected price movements conditioned on outside market factors and then testing whether the deviation from expected price movements in the wake of new information is sufficiently large that simple random movement can be rejected as the cause.

49. To analyze cause and effect, I performed an event study to determine whether the price of Energy Transfer Common Units reacted to earnings announcements in a manner significantly different from how it moved on days with no Energy Transfer-related news. Based on the event study I performed, which explicitly controls for market and industry factors, I find that there is a clear cause-and-effect relationship between the release of new public information about Energy Transfer and the market price of Energy Transfer Common Units. I now describe in further detail the event study methodology, the events I test, and the results.

50. A well-accepted method for performing an event study is to estimate a regression model over some period of time (an "estimation window") to observe the typical relationship between the market price of the relevant security and broad market factors.⁵⁰ I have performed such an analysis by evaluating the relationship between Energy Transfer Common Units' daily returns (percentage change in price) and the daily returns for the S&P 500 Total Return Index

⁴⁹ A. Craig MacKinlay, *Event Studies in Economics and Finance*, 35 J. ECON. LITERATURE, 13 (1997).

⁵⁰ A "regression" or "regression model" is a statistical technique for measuring the ability of one or more variables (the "independent variables") to "explain" another variable of interest (the "dependent variable"). In this case, the daily percentage change in Energy Transfer Common Units (the Energy Transfer daily return) is the dependent variable and the contemporaneous daily returns for a market and industry index are the independent variables. For a general discussion of regression analysis, see Damodar N. Gujarati, *Basic Econometrics*, McGraw Hill, Chapters 1-3 (3rd ed. 1995).

(the “Market Index”) and the S&P 500 Oil, Gas & Consumable Fuels Index (the “Industry Index”).^{51,52,53}

51. For each trading day analyzed, I constructed a regression model using data from the prior 120 trading days (roughly six months).⁵⁴ By using such a “rolling” estimation window, my regression model allows for the relationships between Energy Transfer Common Unit returns and the Market Index and Industry Index, as well as firm-specific volatility, to update over time according to the data observed over the most recent 120 trading day period. Use of a rolling model to account for changing volatility and evolving relationships with indices is accepted in peer-reviewed literature.⁵⁵

52. The model indicates that there is a positive correlation between Energy Transfer Common Units and the control variables. In other words, the movement of the Market Index and Industry Index helps explain the price movements of Energy Transfer Common Units during the Class Period. For instance, choosing August 22, 2017 (a day in the Class Period) purely as an example, and looking at the regression results based on the 120 days prior to that day, the estimated coefficient for the S&P 500 is 1.78, which means that a 1% rise in the S&P 500 predicts a 1.78% increase in returns for Energy Transfer Common Units. The estimated coefficient for the Industry Index is 1.39, meaning that the expected return for Energy Transfer

⁵¹ The Industry Index is comprised of companies in the S&P 500 that are classified in the GICS Integrated Oil & Gas, Oil & Gas Exploration & Production, Oil & Gas Refining & Marketing, Oil & Gas Storage & Transportation, and Coal & Consumable Fuels sub-industries.

⁵² The returns of the Industry Index are net of the S&P 500 Total Return Index.

⁵³ As a robustness check, using the Henry Hub natural gas price and the WTI crude oil price were also considered. The use of the prices of these natural resources did not alter the predictive power of the model and does not materially affect any conclusions.

⁵⁴ A. Craig MacKinlay, *Event Studies in Economics and Finance*, 35 J. ECON. LITERATURE, 15 (1997): “For example, in an event study using daily data and the market model, the market model parameters could be estimated over the 120 days prior to the event.”

⁵⁵ Phillip A. Braun, *Good News, Bad News Volatility, and Betas*, 50 J. FIN. 1575, 1597 (1995).

Common Units increases by approximately 1.39% for every 1% increase in the Industry Index over and above the return of the S&P 500. **Exhibit 5** plots the estimated coefficients for the rolling regression models for each day during the Class Period.

53. Another important statistic from the regression is the standard deviation of the errors, which measures the degree of imprecision in the predictions from the model. Put another way, this measure provides a metric for how much unexplained price movement remains in Energy Transfer Common Units after controlling for the Market Index and Industry Index. For instance, on the example date of August 22, 2017, the model predicted that, absent any value relevant new firm-specific information, the price of Energy Transfer Common Units would increase by 1.46%, because the S&P 500 was up 1.00% and the Industry Index was down 0.24%.⁵⁶ Because of the inherent randomness observed in unit price returns, I do not expect the model to predict returns exactly; the standard deviation of the errors provides a means to determine whether the “abnormal return”—the model’s prediction error, or the difference between the actual return and the return predicted by the model—is more extreme than would be expected due to inherent randomness alone.

54. In this example, I observe an actual return of 1.72%. Thus, the abnormal return for this day is approximately 0.26%—the actual return of 1.72% minus the predicted return of 1.46%. Using the standard deviation of the errors from the regression model, I can tell if this abnormal return is sufficiently large to allow me to reject random movement as the explanation for it, and therefore to conclude that new information caused a change to the stock price.

⁵⁶ The predicted return of 1.46% is found as follows: $1.78 * 1.00\%$ (Coefficient on Market Index *times* Market Index return) + $1.39 * -0.24\%$ (Coefficient on Industry Index Return *times* Industry Index Return) + 0.01% (constant term from regression).

55. The test for whether randomness can be rejected is done by calculating what is known as a “t-statistic,” which represents the number of standard deviations between the actual observation and the prediction. For the example date, an abnormal return of 0.26% represents 0.17 standard deviations or a t-statistic of 0.17 (abnormal return of 0.26% divided by the standard deviation of the errors of 0.015).⁵⁷ Using the standard assumption that, in the absence of new value relevant company-specific news, abnormal returns will be normally distributed around zero, probability theory implies that, based on randomness alone, and using a 95% confidence level and large sample size, the abnormal return should have a t-statistic greater than 1.96 (or less than -1.96) only 5% of the time.^{58,59} Stating this point another way, there is a 95% confidence that the actual return will fall within 1.96 standard deviations of the predicted return unless there is some non-random explanation.

56. Since our example date has a t-statistic of 0.17, the abnormal return is not statistically significant at the 95% confidence level, and I cannot reject randomness as the cause of the abnormal price movement with greater than 95% confidence. By contrast, if, on a particular day, one observes an abnormal return that has a t-statistic of a magnitude greater than 1.96 (statistically significant at the 95% confidence level) and one observes new value relevant

⁵⁷ The standard deviation of the errors are plotted in **Exhibit 6**. The standard deviation of the error is also known as the standard error. “An estimate based on a sample is likely to be off the mark, at least by a small amount, because of random error. The standard error gives the likely magnitude of this random error, with smaller standard errors indicating better estimates.” The National Academies Press, Reference Manual on Scientific Evidence, Third Edition, 2011, p. 243.

⁵⁸ Basic statistics state that for a normally distributed variable, 5% of the observations are expected to fall outside 1.96 standard deviations from the mean. “The normal distribution has the property that the area within 1.96 standard errors of the mean is equal to 95% of the total area.” The National Academies Press, Reference Manual on Scientific Evidence, Third Edition, 2011, p. 342.

⁵⁹ The financial economics literature often identifies the 90% threshold as a relevant boundary for significance as well. David I. Tabak & Frederick C. Dunbar, “Materiality and Magnitude: Event Studies in the Courtroom,” *Litigation Services Handbook, The Role of the Financial Expert*, Ch. 19, (3rd ed. 2001).

firm-specific information, one would reject randomness as the explanation with at least 95% confidence and infer that the new information is the cause of the unit price movement.

57. **Exhibit 6** shows that the standard deviation of the errors for Energy Transfer Common Units varied over the Class Period. As noted above, by adopting a rolling regression model, my event study explicitly adjusts for changing Company-specific volatility.

58. To analyze cause-and-effect, I examined the price response of Energy Transfer Common Units to the eleven earnings announcements during the Class Period. *See Exhibit 7.*

59. There are many academic articles and financial treatises that explain theoretically and demonstrate empirically that the release of company earnings information often (but not necessarily always) causes a significant change in investors' beliefs regarding the value of a security.⁶⁰ Also, newly released earnings reports by a company are an objective set of news to identify and test. Considering the second earnings release listed in **Exhibit 7** as an example, after market hours on August 8, 2017 the Company announced positive second quarter results that were above expectations.⁶¹ In response, the market price of Energy Transfer Common Units increased by 5.81%, compared to the predicted return, based solely on the Market Index and Industry Index, of 0.17%. Thus, the abnormal return on August 9, 2017 was 5.64%. With a t-statistic of 3.83, this abnormal price movement is statistically significant at the 99% level, and I therefore have scientific evidence that Energy Transfer Common Units reacted rapidly to this new information.

⁶⁰ William H. Beaver, "The Information Content of Annual Earnings Announcements: New Insights from Intertemporal and Cross-Sectional Behavior," *Empirical Research in Accounting: Selected Studies*, 1968, supplement to the *Journal of Accounting Research*, Vol. 6, 67-92 (1968); Robert G. May, "The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes," *Empirical Research in Accounting: Selected Studies*, 1971, supplement to the *Journal of Accounting Research*, Vol. 9, 119-163(1971); Joseph Aharony & Itzhak Swary, "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance*, Vol. 35, No. 1, 1-12 (1980).

⁶¹ *See*, "Energy Transfer Equity Reports Second Quarter Results," *Business Wire*, August 8, 2017.

60. Similar to this example, I analyzed the market reaction to Energy Transfer's other earnings announcements I identified above. In total, of the eleven earnings announcements Energy Transfer issued during the Class Period, five resulted in statistically significant price movements above the 95% confidence level.^{62,63,64}

61. **Exhibit 7** presents a summary of the earnings releases during the Class Period.

62. I then compared these results against the 46 days during the Class Period where I identified no Energy Transfer-related news from the Factiva database and when there were no analyst reports, SEC filings or press releases issued.⁶⁵ Of these 46 days, there were no days with a statistically significant price movement. Thus, during the Class Period, there was a statistically significant price reaction at the 95% confidence level or greater on 45.45% of the days with earnings announcements, but on 0% of the days with no Energy Transfer-related news.^{66,67} This is powerful scientific evidence of a cause-and-effect relationship between new publicly released information concerning the Company and changes in the price of Energy Transfer Common Units.

63. Furthermore, on the 46 days with no news, the average change in price of Energy Transfer Common Units was 0.86% after controlling for market and industry factors, while on the 11 earnings announcement dates, the average change in price of Energy Transfer Common

⁶² It is not unusual to observe many earnings announcements that are not statistically significant. This happens, for instance, in quarters where the firm roughly met expectations, if the firm offered little change in guidance, and/or if there was a mix of both positive and negative information.

⁶³ Of the five earnings announcements statistically significant at the 95% confidence level, three were also statistically significant at the 99% level.

⁶⁴ The earnings announcement on November 7, 2019 was also statistically significant at the 90% level.

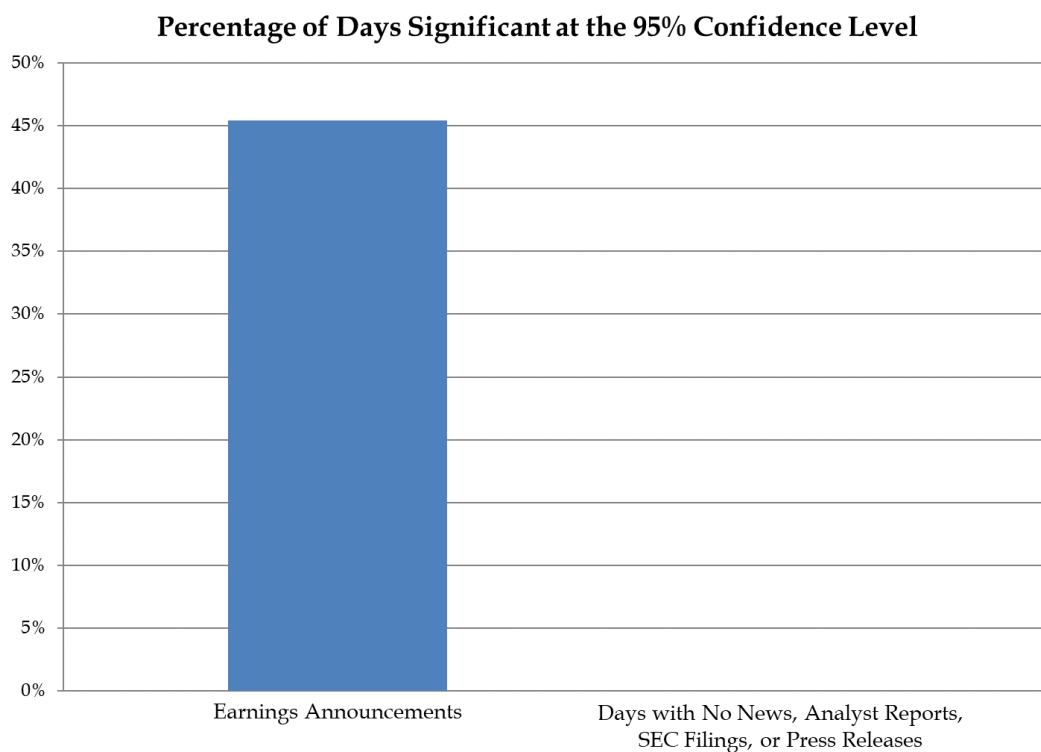
⁶⁵ Through Energy Transfer's press releases, I found two articles that were not included on the Factiva database. These included: October 10, 2017 and July 27, 2018.

⁶⁶ This difference between 45.45% and 0% is itself statistically significant at the 99% confidence level.

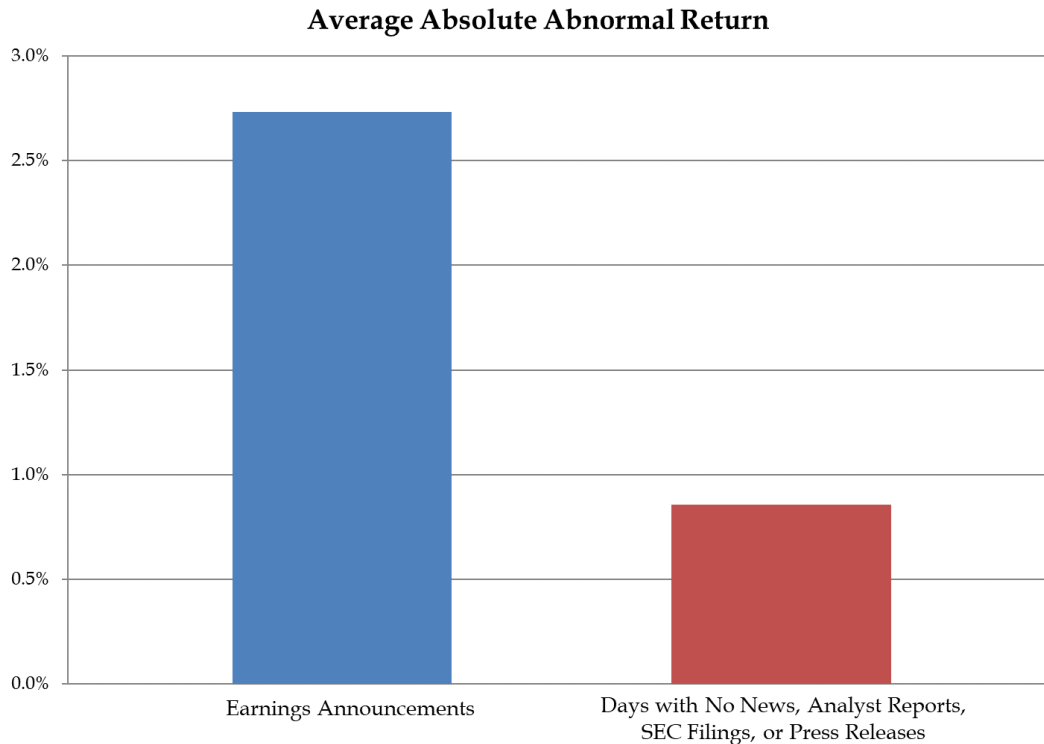
⁶⁷ Based on randomness alone, one would expect 5% of the no news days to be statistically significant. The observed rate of 0% is not statistically significantly different than 5%.

Units was 2.73% after controlling for market and industry factors. In other words, the average magnitude of abnormal unit price movement on earnings announcement days was about 3.2 times higher on earnings announcement days than on days with no news.⁶⁸ Again, this demonstrates that, on days when important company-specific information is released to the market, Energy Transfer's unit price generally moves much more than on days where there is no company-specific news. This provides further evidence of a cause-and-effect relationship between company-specific news and changes in the price of Energy Transfer Common Units, and thus an efficient market.

64. The bar charts below summarize this analysis while **Exhibit 8** gives more detail.



⁶⁸ This difference between 2.73% and 0.86% is itself statistically significant at the 99% confidence level.

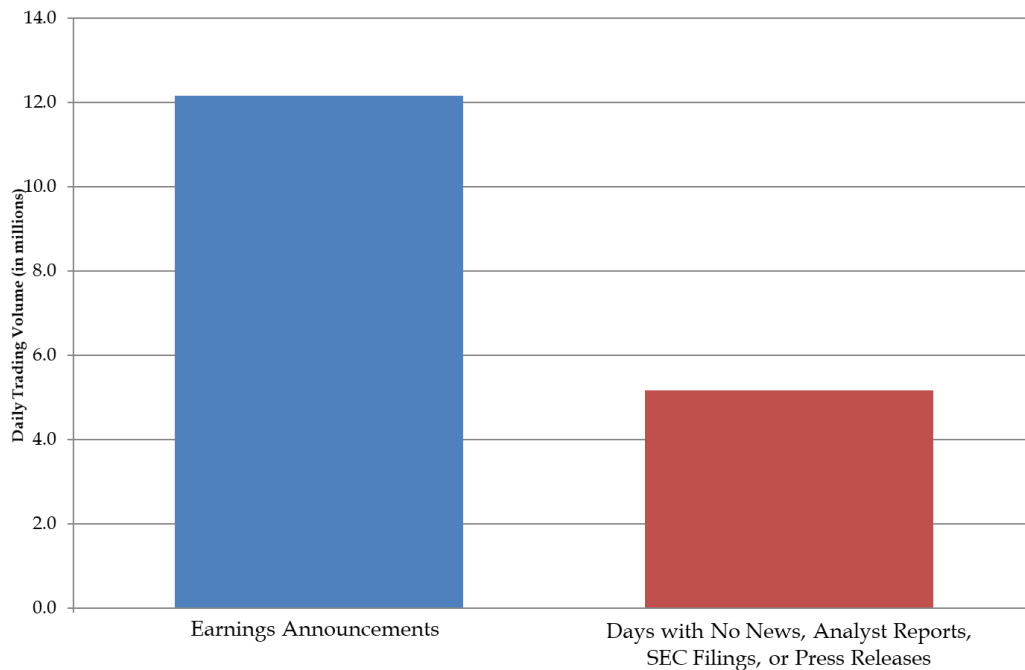


65. Finally, when important Company-specific news is released to the market (*e.g.*, earnings announcements), the daily trading volume of Energy Transfer Common Units also tends to be much higher⁶⁹ than on days where there is no news. *See* Ex. 8. For instance, the average daily trading volume of the 11 days with earnings announcements was 12.2 million. Compare this to the average daily trading volume of 5.2 million on the 46 days where there was no Energy Transfer news, analyst reports, SEC filings, or press releases during the Class Period.⁷⁰ The bar chart below summarizes this analysis.

⁶⁹ William H. Beaver, “The Information Content of Annual Earnings Announcements,” *Empirical Research in Accounting: Selected Studies, 1968*, supplement to the *Journal of Accounting Research*, Vol. 6, 69, 84 (1968).

⁷⁰ This difference between 12.2 million and 5.2 million is itself statistically significant at the 99% confidence level.

Average Daily Trading Volume



66. The bar charts above reveal a strong cause-and-effect relationship between new, Company-specific news and rapid changes in the price of Energy Transfer Common Units. The earnings announcement days have a much greater percentage of significant price movements, higher daily trading volume on average, and statistically significantly larger price changes than those found on days with no news.

67. In conclusion, the event study analysis presented in this section demonstrates a clear cause-and-effect relationship between new material news and changes in the market price of Energy Transfer Common Units during the Class Period.

G. KROGMAN FACTOR 1: MARKET CAPITALIZATION

68. In *Krogman v. Sterritt*, the court noted that economic theory points to other possible relevant factors for determining whether a stock trades in an efficient market, in addition to the

Cammer factors.⁷¹ The *Krogman* Court held, “[m]arket capitalization, calculated as the number of shares multiplied by the prevailing share price, may be an indicator of market efficiency because there is a greater incentive for stock purchasers to invest in more highly capitalized corporations.”⁷² Furthermore, Thomas and Cotter find that firms with a larger market capitalization tend to have “larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following.”⁷³ Therefore, market capitalization is another quantifiable measure that is likely correlated with efficiency.

69. Energy Transfer Common Units had a higher market capitalization than the majority of NYSE and NASDAQ stocks during the Class Period, thus suggesting this factor is supportive of efficiency. There were at minimum 1,079.1 million Energy Transfer Common Units outstanding throughout the Class Period.⁷⁴ The market capitalization for Energy Transfer Common Units averaged \$26.28 billion during the Class Period, as shown in **Exhibit 9**.⁷⁵ **Exhibit 10** shows that during the Class Period, Energy Transfer Common Units’ market capitalization ranged from the 91st to 97th percentile of the combined NYSE and NASDAQ markets for the applicable quarters during the Class Period.⁷⁶ In other words, over the Class

⁷¹ *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001) (“*Krogman*”). The factors identified by the *Krogman* Court are 1) market capitalization, 2) size of float of common stock, and 3) bid-ask spread.

⁷² *Krogman*, 202 F.R.D. at 478.

⁷³ Randall S. Thomas & James F. Cotter, *Measuring Securities Market Efficiency in the Regulatory Setting*, 63 LAW & CONTEMP. PROBS. 117 (2000).

⁷⁴ Units outstanding data obtained from SEC filings.

⁷⁵ On October 19, 2018, due to the complete merger of Energy Transfer Equity, L.P. (“ETE”) and Energy Transfer Partners, L.P. (“ETP”), ETP common units converted into the right to receive 1.28 ETE common units, resulting in 1.46 billion ETE units issued to ETP unitholders. (See, “Energy Transfer Equity, L.P. and Energy Transfer Partners, L.P. Complete Merger, Simplify Structure”, *Business Wire*, October 19, 2019, and Energy Transfer SEC Form 8-K filed on October 19, 2018, p. 2.)

⁷⁶ Bloomberg.

Period, Energy Transfer Common Units had a higher market capitalization than at least 91% of the firms on the combined NYSE and NASDAQ exchanges.

70. Given that the market capitalization for Energy Transfer Common Units was consistently large relative to other publicly traded companies, this factor is supportive of market efficiency for Energy Transfer Common Units.

H. KROGMAN FACTOR 2: THE BID-ASK SPREAD

71. The second *Krogman* factor considers the bid-ask spread for a security, reasoning that: “[a] large bid-ask spread is indicative of an inefficient market, because it suggests that the stock is too expensive to trade.”⁷⁷ The bid-ask spread is a measurement of the difference between what buyers are bidding to acquire a security and what sellers are asking to sell the security, and therefore being a measure of the cost to transact in a market. Bid-ask spread is an important indicator of the degree to which a market is developed. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price. In addition, the wider the bid-ask spread, the more costly it is to arbitrage away small inefficiencies because the cost of the trade could be greater than the perceived inefficiency. Thus, a narrow bid-ask spread supports the presence of an efficient market where the prices reflect publicly available information.

72. I analyzed bid-ask spreads for Energy Transfer Common Units during the Class Period. **Exhibit 11** shows that, during this period, the time-weighted average percentage bid-ask spread for Energy Transfer Common Units in each month was between 0.017% and 0.049%. This is well below the average and median bid-ask spread of a random sample of 100 other

⁷⁷ *Krogman*, 202 F.R.D. at 478.

common stocks trading on the NYSE and NASDAQ in October 2019 (the full month of the Class Period during which Energy Transfer had the largest percentage bid-ask spread).^{78,79} **Exhibit 11** demonstrates that, in October 2019, Energy Transfer Common Units had a monthly average bid-ask spread of 0.049%, while a randomly selected group of 100 other common stocks on the NYSE and NASDAQ had a monthly average bid-ask spread of 0.84%.⁸⁰ Accordingly, Energy Transfer Common Units' bid-ask spread was low during the Class Period, and this factor further supports market efficiency for Energy Transfer Common Units.

I. **KROGMAN FACTOR 3: PUBLIC FLOAT**

73. The *Krogman* Court's final factor is the proportion of the float that is public (*i.e.*, the proportion of shares not held by insiders), with a large proportion considered to be indicative of market efficiency. As shown in **Exhibit 12**, during the Class Period, insiders held 22.01% of all outstanding units of Energy Transfer Common Units, meaning that 77.99% of Energy Transfer's units were held by non-insiders. This large percentage of units held by non-insiders supports market efficiency and the market value of the public float exceeded \$11.5 billion.

⁷⁸ Quote data for Energy Transfer and other publicly traded stocks were obtained from the TICK database. See <https://tickapi.tickdata.com/>.

⁷⁹ I constructed a random sample because I am not aware of any exchange-wide reporting of average or median bid-ask spreads. Determining the average bid-ask spread for the entire market would be a very costly and data intensive process, therefore I adopted a random sampling methodology. I determined the constituents of the NYSE and NASDAQ for October 2019 and then randomly generated a list of 100 common stock securities. I then calculated the time-weighted average monthly bid-ask spread for October 2019. Energy Transfer Common Units averaged a spread of \$0.0047 for the entirety of the Class Period, compared to the monthly average spread of the 100 other common stocks in October 2019 of \$0.08

⁸⁰ The time-weighted average bid-ask spread was calculated by taking the average of the spread during trading hours on the primary exchange of each security, weighted by the amount of time each quote prevails in the market. That is, I take the weighted average quote, with the weight being the number of seconds between that quote and the next quote that occurs. Spread is calculated as the difference between the bid price and ask price divided by the midpoint of the bid-ask spread. I calculated the National Best Bid and Offer using the data filtering procedures described in Roger D. Huang & Hans R. Stoll, *Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE*, 41 J. FIN. ECON. 313 (1996).

J. ADDITIONAL FACTOR: INSTITUTIONAL OWNERSHIP

74. Institutional investors are considered to be sophisticated and well-informed, with access to most publicly available information for the stocks that they own. These investors include mutual funds, pension funds, investment banks, and other types of large financial institutions that have substantial resources to analyze the securities they purchase for their portfolios. As **Exhibit 12** shows, 1,222 separate institutions owned Energy Transfer Common Units during the Class Period, holding on average 63.46% of the public float. The substantial level of institutional ownership of Energy Transfer Common Units during the Class Period, coupled with the high trading volume described above, further supports a conclusion of market efficiency.

K. ADDITIONAL FACTOR: AUTOCORRELATION

75. If previous price movements of a security have the ability to predict future price movements, then it is said to be “autocorrelated.” Autocorrelation is relevant to efficiency because, if the autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of it, then past price movements, which are public information, are not fully reflected in the current price—which in turn suggests that the market is inefficient.

76. Autocorrelation may occur from time to time for random reasons or due to the pattern of firm-specific news. Efficiency would only be violated, however, if the autocorrelation were large enough and persistent enough that a trader could consistently earn riskless profits over time.⁸¹

⁸¹ Doron Avramov, Tarun Chordia & Amit Goyal, *Liquidity and Autocorrelations in Individual Stock Returns*, 61 J. FIN. 2365, 2367-68 (2006); Michael C. Jensen, *Some Anomalous Evidence Regarding Market Efficiency*, 6 J. FIN. ECON. 95-101 (1978).

77. A well-accepted methodology to test for the existence of autocorrelation is to run a regression analysis that tests whether, on average, the abnormal return from the previous day has a statistically significant effect on the abnormal return today.⁸² If the previous day's abnormal return has no statistically significant predictive power, then the null hypothesis of an absence of autocorrelation (which would be consistent with market efficiency) cannot be rejected.

78. **Exhibit 13** displays the autocorrelation coefficient for Energy Transfer Common Units using the abnormal returns from the event study model described above. The coefficient for the Class Period is not statistically different than zero. This result is thus inconsistent with the notion that an investor could consistently predict abnormal movements using prior price movements and earn arbitrage profits. Therefore, this factor also supports the conclusion that Energy Transfer Common Units traded in an efficient market throughout the Class Period.

L. ADDITIONAL FACTOR: OPTIONS

79. In addition to the factors analyzed above, there was also considerable option trading in Energy Transfer Common Units during the Class Period.⁸³ Academic articles have demonstrated that options written on existing assets can improve efficiency by permitting an expansion of the contingent payout available to investors based on changes in the price of the security.⁸⁴ Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.⁸⁵ Thus, this factor

⁸² William H. Greene, *Econometric Analysis*, Prentice Hall, Sixth Edition, 2008, Chapter 19, p. 644.

⁸³ For instance, according to iVolatility, there were 2,117,941 Energy Transfer Common Units put contracts and 6,815,483 Energy Transfer Common Units call contracts that traded during the Class Period.

⁸⁴ Stephen A. Ross, *Options and Efficiency*, 90 Q. J. ECON. 75 (1976).

⁸⁵ Raman Kumar, Atulya Sarin & Kuldeep Shastri, *The Impact of Options Trading on the Market Quality of the Underlying Security: An Empirical Analysis*, 53 J. FIN. 717 (1998).

also supports that Energy Transfer Common Units traded in an efficient market throughout the Class Period.

* * * * *

80. To summarize, each of the *Cammer*, *Krogman*, and other factors I analyzed supports the conclusion that the market for Energy Transfer Common Units was efficient.

VIII. DAMAGES

81. Counsel for the Lead Plaintiff also asked me to opine on whether per share damages could be measured for all Class members under Section 10(b) of the Exchange Act using a common methodology that is consistent with the Lead Plaintiffs' theory of liability. There is a standard and well-accepted method for calculating class wide damages in cases under Section 10(b) of the Exchange Act. This method, typically referred to as the "out-of-pocket" method, equates damages to the artificial inflation in the share price at the time of purchase minus the artificial inflation per share at the time of sale (or, if the share is not sold before full revelation of the fraud, the artificial inflation at the time of purchase, subject to the Private Securities Litigation Reform Act of 1995's ("PSLRA") "90-day lookback" provision, a formulaic limit on damages that also can be applied class-wide).⁸⁶ The out-of-pocket method has been applied in virtually every Section 10(b) matter I have observed or participated in as a consulting, testifying, or neutral expert.

82. Once the inflation per share has been quantified on each day during the class period, the computation of damages for each class member is formulaic based upon information

⁸⁶ Specifically, the PSLRA states: "...in any private action arising under this title in which the plaintiff seeks to establish damages by reference to the market price of a security, the award of damages to the plaintiff shall not exceed the difference between the purchase or sale price paid or received, as appropriate, by the plaintiff for the subject security and the mean trading price of that security during the 90-day period beginning on the date on which the information correcting the misstatement or omission that is the basis for the action is disseminated to the market." See, Private Securities Litigation Reform Act of 1995, § 78u-4(e)(1).

collected in the claims process (*i.e.*, the investor's purchase and sale history for the security, which is routinely available from brokerage statements and/or other documents that provide evidence of securities transactions). Therefore, there is a well-accepted method to compute damages on a class-wide basis in Section 10(b) matters such as this.

83. Separate and apart from whether there is a common method for computing damages is the question of how to quantify the artificial inflation per share that is an input to the damages methodology. The quantification of the artificial inflation per share requires a detailed loss causation analysis.⁸⁷ Nevertheless, whatever the method for determining the artificial inflation per share, it would be common to all class members.

84. For example, the most widely-used technique to quantify artificial inflation starts from an event study that measures price reactions to disclosures that revealed the relevant truth concealed by the alleged material omissions and/or misrepresentations (*i.e.* a "corrective disclosure").⁸⁸ Such an event study would also need to consider whether and to what extent any non-fraud related information (*i.e.* "confounding information") contributed to the observed price movement on the days on or following the alleged corrective disclosures. If there is such confounding information, disaggregating the price impact of corrective disclosures from confounding information may utilize commonplace valuation techniques and may depend on information learned through discovery. Determining the specific valuation approach necessary to perform a loss causation analysis that reasonably disaggregates corrective and confounding information is an inherently case-specific question that depends on specific facts and

⁸⁷ I have not been asked to conduct a loss causation analysis at this time. In my experience, loss causation analyses are often informed by information learned in discovery.

⁸⁸ The event study I have performed for this report is for Market Efficiency purposes and is not an attempt at valuing artificial inflation.

circumstances. Examples of such techniques include, but are not limited to, fundamental valuation analysis such as discounted cash flow methods, valuation multiple methods (*i.e.* price to earnings multiples, price to EBITDA multiples, price to revenue multiples, etc.), use of academic studies regarding the value of certain types of information, and other available valuations whether from securities analysts or made available through discovery. Regardless of the technique used, it is performed on a class-wide basis – in other words, the specific methodology applies regardless of the identity or circumstances of any individual class member.

85. The loss causation analysis would also require a determination of how inflation per share may have evolved over the class period. Again, the nature of this analysis is intensely factual, case-specific, and may depend on information learned through discovery. For example, an often-used method is to assume “constant dollar inflation,” *i.e.*, that the artificial inflation was the same dollar amount throughout the class period (except to the extent inflation was removed by corrective disclosures that partially—but not fully—revealed the truth to the market during the class period). In certain circumstances, it may be more reasonable to assume “constant percentage inflation”—that the price was inflated by the same percentage throughout the class period (except to the extent that partial corrective disclosures removed some inflation during the class period). In other cases, it may make sense to assume that artificial inflation evolved during the class period based upon the nature and timing of specific misstatements, or that artificial inflation varied on a daily basis as a result of information contained in internal documents obtained in discovery. The determination of how artificial inflation evolved over the class period is a case-specific, fact-specific loss causation exercise that can rely on valuation techniques including, but not limited to, event studies, fundamental valuation, contemporaneous valuations

or documents, or some combination of the above. Critically, however, all of these methodologies apply class-wide and do not depend on the identity or circumstance of any specific investor.

86. Accordingly, although I have not been asked to calculate class-wide damages in this report, and such calculations would likely depend, at least in part, on the completion of discovery and full development of the case record, based on my expertise and experience in dozens of similar matters and understanding the nature of the claims in this case, I conclude that damages in this action are subject to a well-settled, common methodology that can be applied to the Class as a whole.

IX. CONCLUSION

87. In sum, every factor analyzed supports my opinion that Energy Transfer Common Units traded in an efficient market during the Class Period. Furthermore, class-wide damages in this matter can be calculated on a class-wide basis using a common methodology.

88. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on September 17, 2021.


Chad Coffman

Exhibit 1

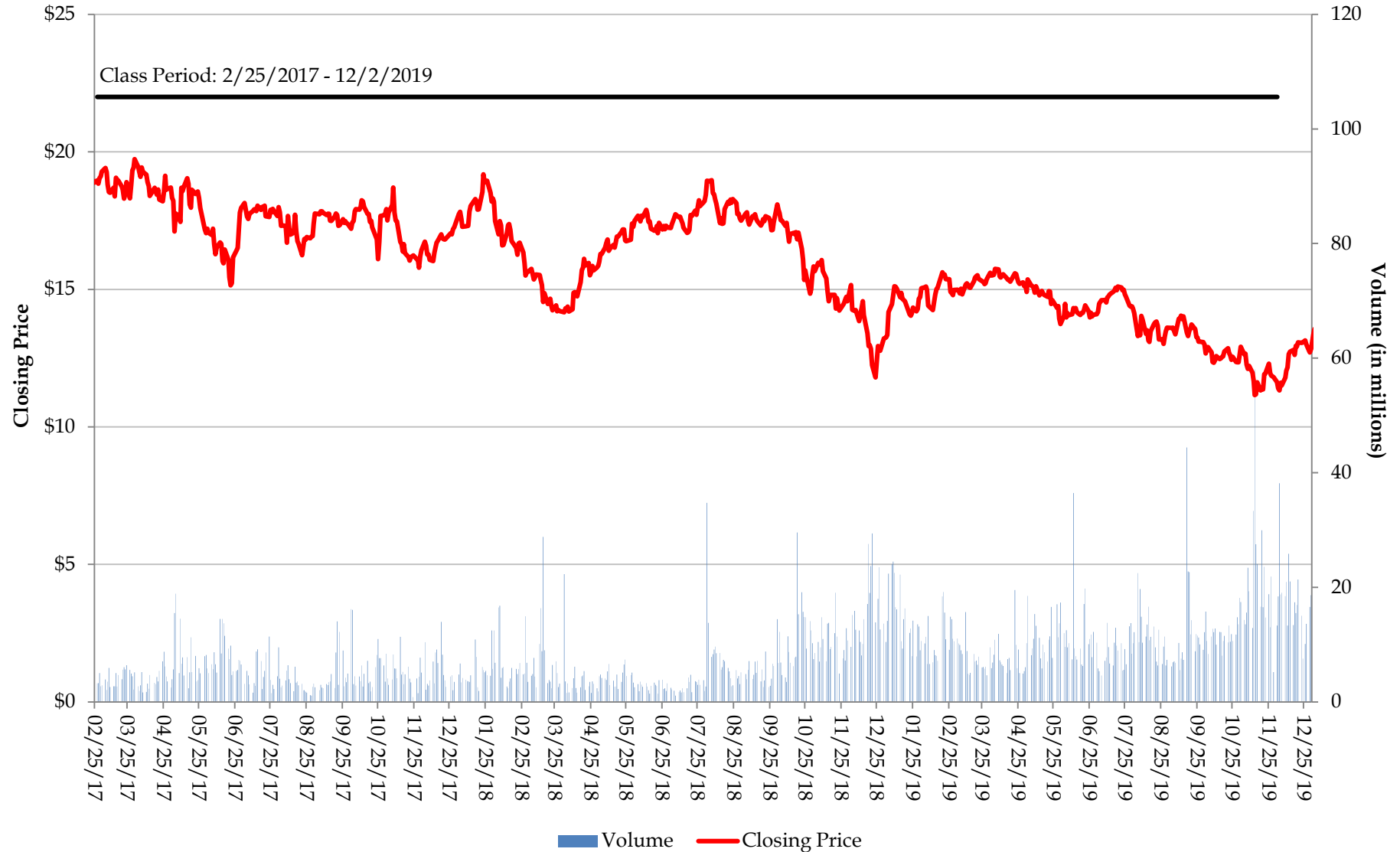
Summary of Efficiency Factors for Energy Transfer

Factor	Summary of Factor	Energy Transfer
Average Weekly Trading Volume Cammer I	"Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for a security is an efficient one; 1% would justify a substantial presumption."	<ul style="list-style-type: none"> The average weekly trading volume of 2.38%, as a percentage of units outstanding, exceeds the standard of 2% that courts have suggested would justify a strong presumption of an efficient market (Note: 40.2 million units traded weekly on average during the Class Period).
Analyst Coverage Cammer II	"...it would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors."	<ul style="list-style-type: none"> During the Class Period at least 16 securities analysts issued 224 analyst reports which implies that important information relevant to trading Energy Transfer Common Units was widely communicated to the market.
Market Makers Cammer III	"For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption."	<ul style="list-style-type: none"> Because Energy Transfer's units were exchange-traded on the NYSE during the Class Period, not over the counter, this factor is satisfied. According to Bloomberg, throughout the Class Period, there were at least 122 market makers for Energy Transfer Common Units.
SEC Form S-3 Eligibility Cammer IV	"It would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency."	<ul style="list-style-type: none"> Energy Transfer filed many variations of Form S-3 (including Forms S-3, S-3/A, and S-3ASR) before and during the Class Period (on 2/6/2017, 2/8/2017, 2/28/2017, and 3/3/2017). I have found no evidence to believe that Energy Transfer was not S-3 eligible throughout the Class Period, thus satisfying this factor.
Price Reaction to New Information Cammer V	"...one of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price."	<ul style="list-style-type: none"> The event study demonstrates a clear cause and effect relationship. A statistical test shows a significant contemporaneous relationship between new firm-specific news and significant changes in the market price for Energy Transfer Common Units.
Market Capitalization	Firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."	<ul style="list-style-type: none"> As of 3/31/2017 and 12/31/2019, Energy Transfer's market capitalization was \$21.29 billion and \$34.51 billion, respectively, which is at least the 91st percentile of all NYSE and NASDAQ stocks. Energy Transfer Common Units therefore easily meets this criterion.
Bid-Ask Spread	The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price.	<ul style="list-style-type: none"> During the Class Period, the average percentage bid-ask spread for Energy Transfer Common Units in each month ranged from 0.017% to 0.049%. Energy Transfer's average percentage bid-ask spread was well below the mean and median bid-ask spread of a random sample of 100 other common stocks trading on the NASDAQ and NYSE in October 2019 (the full month when Energy Transfer had the largest bid-ask spread). This supports a finding of efficiency.
Float and Institutional Ownership	Institutional investors are considered to be sophisticated, well-informed investors with access to most publicly available information for the stocks that they own.	<ul style="list-style-type: none"> On average over 77% of Energy Transfer units were held by non-insiders. 1,222 institutions held the majority of the public float throughout the Class Period which further supports the finding that Energy Transfer Common Units traded in an efficient market.
Autocorrelation	If autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it suggests market inefficiency because past price movements are not fully reflected in the current price.	<ul style="list-style-type: none"> There was no evidence of statistically significant autocorrelation, which means that there was no systematic opportunity for a trader to profit from trading Energy Transfer Common Units based solely on its past price movements. This supports a finding of efficiency.
Options	Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.	<ul style="list-style-type: none"> There were 2,117,941 Energy Transfer Common Units put contracts and 6,815,483 Energy Transfer Common Units call contracts that traded during the Class Period. Energy Transfer Common Units therefore easily meets this criterion.

Exhibit 2

Energy Transfer Common Units Price & Volume

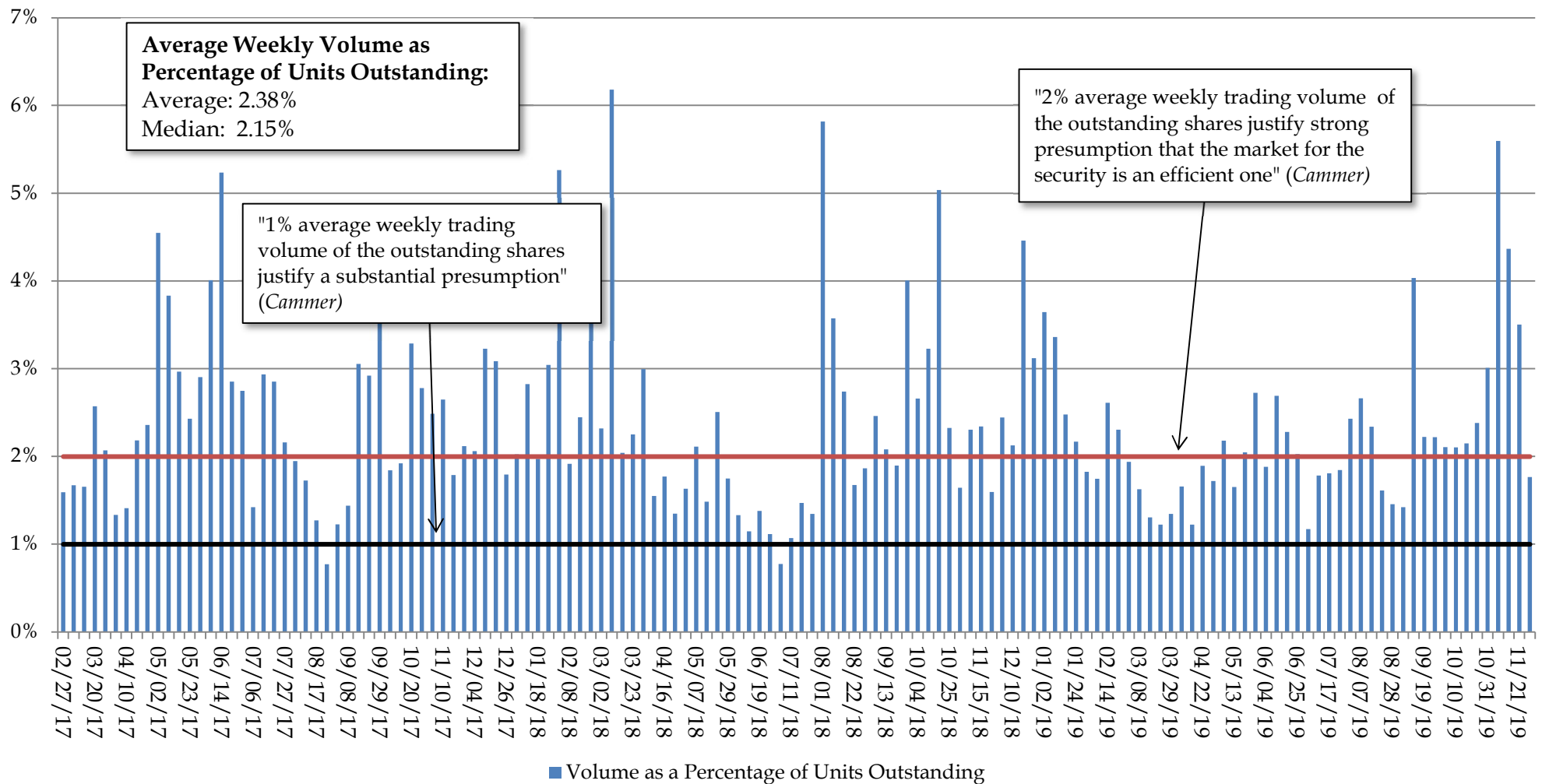
2/25/2017 - 12/31/2019



Sources: Complaint and S&P Capital IQ.

Note: February 27, 2017 is the first market date of the Class Period.

Exhibit 3
Energy Transfer Common Units Average Weekly Trading Volume
as a Percentage of Units Outstanding
2/25/2017 - 12/2/2019



Source: S&P Capital IQ and SEC Filings

Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on February 25, 2017 through December 2, 2019. The last week consists of two trading days and therefore, the average of the daily trading volume on these days is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of units outstanding. The last week is excluded from the average and median calculations.

Exhibit 4

Summary of Securities Analyst Reports Issued for Energy Transfer

Analyst Name		Reports Issued
		During the Class Period: 2/25/2017 - 12/2/2019
[1]	Wells Fargo Securities, LLC	38
[2]	RBC Capital Markets	28
[3]	Credit Suisse	22
[4]	UBS Equities	22
[5]	JPMorgan	19
[6]	Wolfe Research	19
[7]	Morgan Stanley	15
[8]	Jefferies	11
[9]	EVERCORE ISI	10
[10]	BMO Capital Markets	9
[11]	Stephens Inc.	9
[12]	Barclays	7
[13]	CFRA Equity Research	6
[14]	Piper Sandler Companies	5
[15]	Deutsche Bank	2
[16]	Wright Reports	2
Total		224

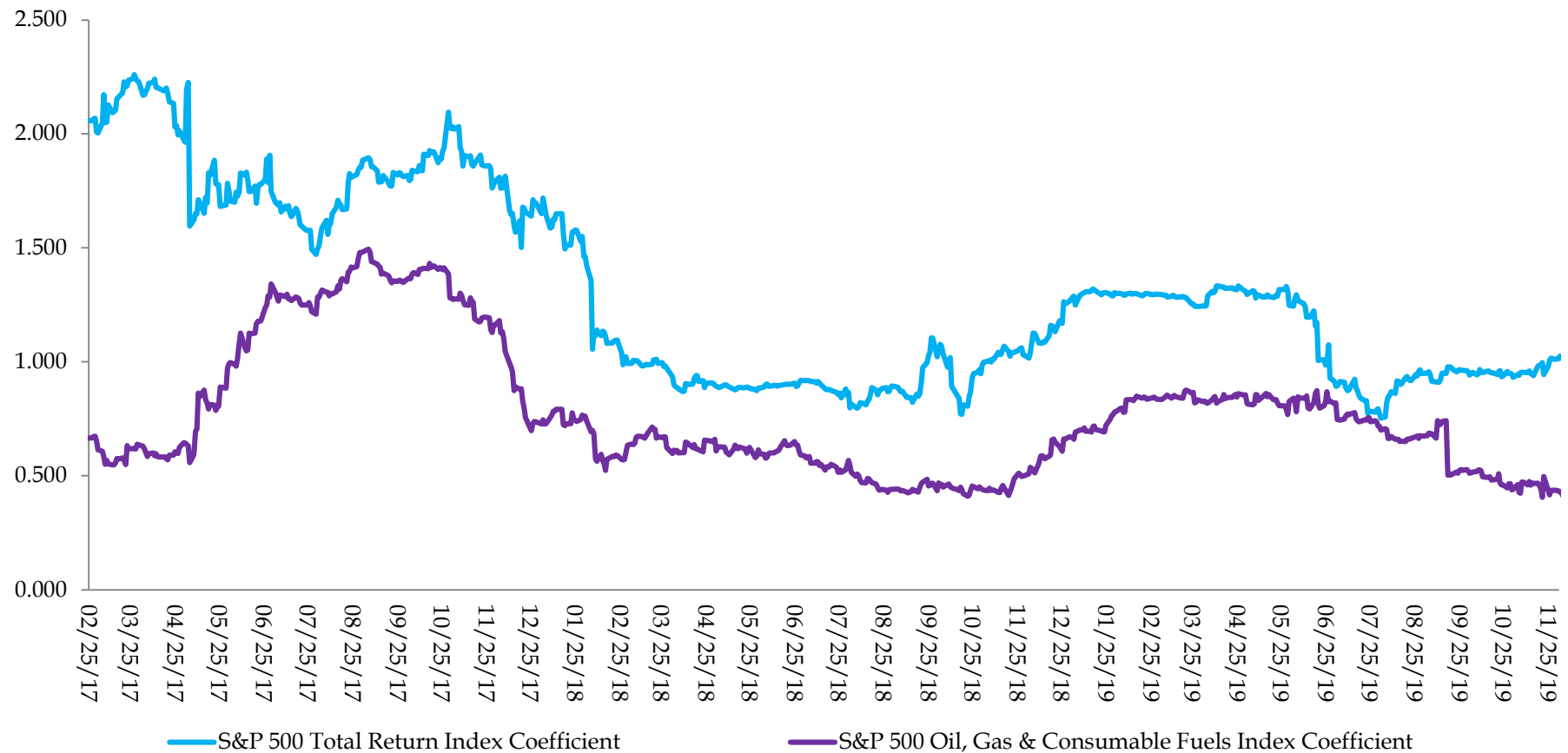
Source: Counsel

Note: There were also 185 analyst reports from Seeking Alpha, an investor-based website.

Exhibit 5

Coefficients from Rolling Event Study Regression for Energy Transfer

2/25/2017 - 12/2/2019



Note: The results are based on a rolling regression of the previous 120 trading days. The regression model controls for a broad market index (S&P 500 Total Return Index) and an industry index (S&P 500 Oil, Gas & Consumable Fuels). The industry index is comprised of companies in the S&P 500 that are classified in the GICS Integrated Oil & Gas, Oil & Gas Exploration & Production, Oil & Gas Refining & Marketing, Oil & Gas Storage & Transportation, and Coal & Consumable Fuels sub-industries. The returns of the S&P 500 Oil, Gas & Consumable Fuels Index are net of the S&P 500 Total Return Index. Earnings announcements and the alleged corrective disclosure dates have been removed from estimation.

Exhibit 6
Standard Deviation of the Errors for Rolling Event Study
Regression for Energy Transfer Common Units
2/25/2017 - 12/2/2019



Note: The results are based on a rolling regression of the previous 120 trading days. The regression model controls for a broad market index (S&P 500 Total Return Index) and an industry index (S&P 500 Oil, Gas & Consumable Fuels). The industry index is comprised of companies in the S&P 500 that are classified in the GICS Integrated Oil & Gas, Oil & Gas Exploration & Production, Oil & Gas Refining & Marketing, Oil & Gas Storage & Transpiration, and Coal & Consumable Fuels sub-industries. The returns of the S&P 500 Oil, Gas & Consumable Fuels Index are net of the S&P 500 Total Return Index. Earnings announcements and the alleged corrective disclosure dates have been removed from estimation.

Exhibit 7
Event Study Analysis of Energy Transfer Earnings Announcements

						Rolling Regression Model (120-day window)					
#	Date	Time	Market Date	Event	Headline	Closing Price	Raw Return	Abnormal Return	Abnormal Dollar Change	t-Stat	Sig Level
1	5/3/2017	4:35 PM	5/4/2017	Q1 2017 Earnings	Energy Transfer Equity Reports First Quarter Results <i>Source -Business Wire</i>	\$17.11	-6.09%	-5.04%	-\$0.92	-2.32	**
2	8/8/2017	5:00 PM	8/9/2017	Q2 2017 Earnings	Energy Transfer Equity Reports Second Quarter Results <i>Source -Business Wire</i>	\$17.67	5.81%	5.64%	\$0.94	3.83	***
3	11/7/2017	4:30 PM	11/8/2017	Q3 2017 Earnings	Energy Transfer Equity Reports Third Quarter Results <i>Source -Business Wire</i>	\$17.79	-4.87%	-4.20%	-\$0.79	-2.76	***
4	2/21/2018	4:30 PM	2/22/2018	Q4 2017 Earnings	Energy Transfer Equity Reports Fourth Quarter Results <i>Source -Business Wire</i>	\$16.67	2.52%	1.91%	\$0.31	1.32	
5	5/9/2018	4:30 PM	5/10/2018	Q1 2018 Earnings	Energy Transfer Equity Reports First Quarter Results <i>Source -Business Wire</i>	\$16.40	-2.44%	-3.26%	-\$0.55	-2.52	**
6	8/8/2018	4:30 PM	8/9/2018	Q2 2018 Earnings	Energy Transfer Equity Reports Second Quarter Results <i>Source -Business Wire</i>	\$18.28	-0.92%	-0.54%	-\$0.10	-0.45	
7	11/7/2018	4:30 PM	11/8/2018	Q3 2018 Earnings	Energy Transfer Reports Third Quarter 2018 Results with Record Financial and Operational Performance <i>Source -Business Wire</i>	\$16.06	0.56%	1.63%	\$0.26	1.38	
8	2/20/2019	4:05 PM	2/21/2019	Q4 2018 Earnings	Energy Transfer Reports Fourth Quarter 2018 Results with Record Performance and Continued Growth <i>Source -Business Wire</i>	\$15.54	0.26%	1.62%	\$0.25	1.23	
9	5/8/2019	4:30 PM	5/9/2019	Q1 2019 Earnings	Energy Transfer Reports Record First Quarter 2019 Results While Delivering on Capital Project Backlog <i>Source -Business Wire</i>	\$14.88	-1.33%	-1.29%	-\$0.19	-1.07	
10	8/7/2019	4:30 PM	8/8/2019	Q2 2019 Earnings	Energy Transfer Reports Second Quarter 2019 Results <i>Source -Business Wire</i>	\$14.03	5.25%	2.92%	\$0.39	2.96	***
11	11/6/2019	4:30 PM	11/7/2019	Q3 2019 Earnings	Energy Transfer Reports Solid Third Quarter 2019 Results <i>Source -Business Wire</i>	\$12.11	-1.22%	-2.00%	-\$0.24	-1.67	*

Sources: S&P Capital IQ and Factiva.

Notes:

(1) The results are based on a rolling regression of the previous 120 trading days. The regression model controls for a broad market index (S&P 500 Total Return Index) and an industry index (S&P 500 Oil, Gas & Consumable Fuels). The industry index is comprised of companies in the S&P 500 that are classified in the GICS Integrated Oil & Gas, Oil & Gas Exploration & Production, Oil & Gas Refining & Marketing, Oil & Gas Storage & Transportation, and Coal & Consumable Fuels sub-industries. The returns of the S&P 500 Oil, Gas & Consumable Fuels Index are net of the S&P 500 Total Return Index. Earnings announcements and the alleged corrective disclosure dates have been removed from estimation.

(2) *** Denotes statistical significance at the 99% confidence level or greater. ** Denotes statistical significance at the 95% confidence level or greater. * Denotes statistical significance at the 90% confidence level or greater.

Exhibit 8
Comparison of Statistical Significance and Abnormal Returns
for Energy Transfer Earnings Announcements
vs. Days with No News during the Class Period

Statistic	Earnings Announcements	Days with No News, Analyst Reports, SEC Filings, or Press Releases
N ⁽¹⁾	11	46
Significant Days at 95% Confidence Level	5	0
% Significant Days at 95% Confidence Level ⁽²⁾	45.45%	0.00%
Average Absolute Abnormal Return ⁽³⁾	2.73%	0.86%
Average Volume (Millions) ⁽⁴⁾	12.2	5.2

Notes:

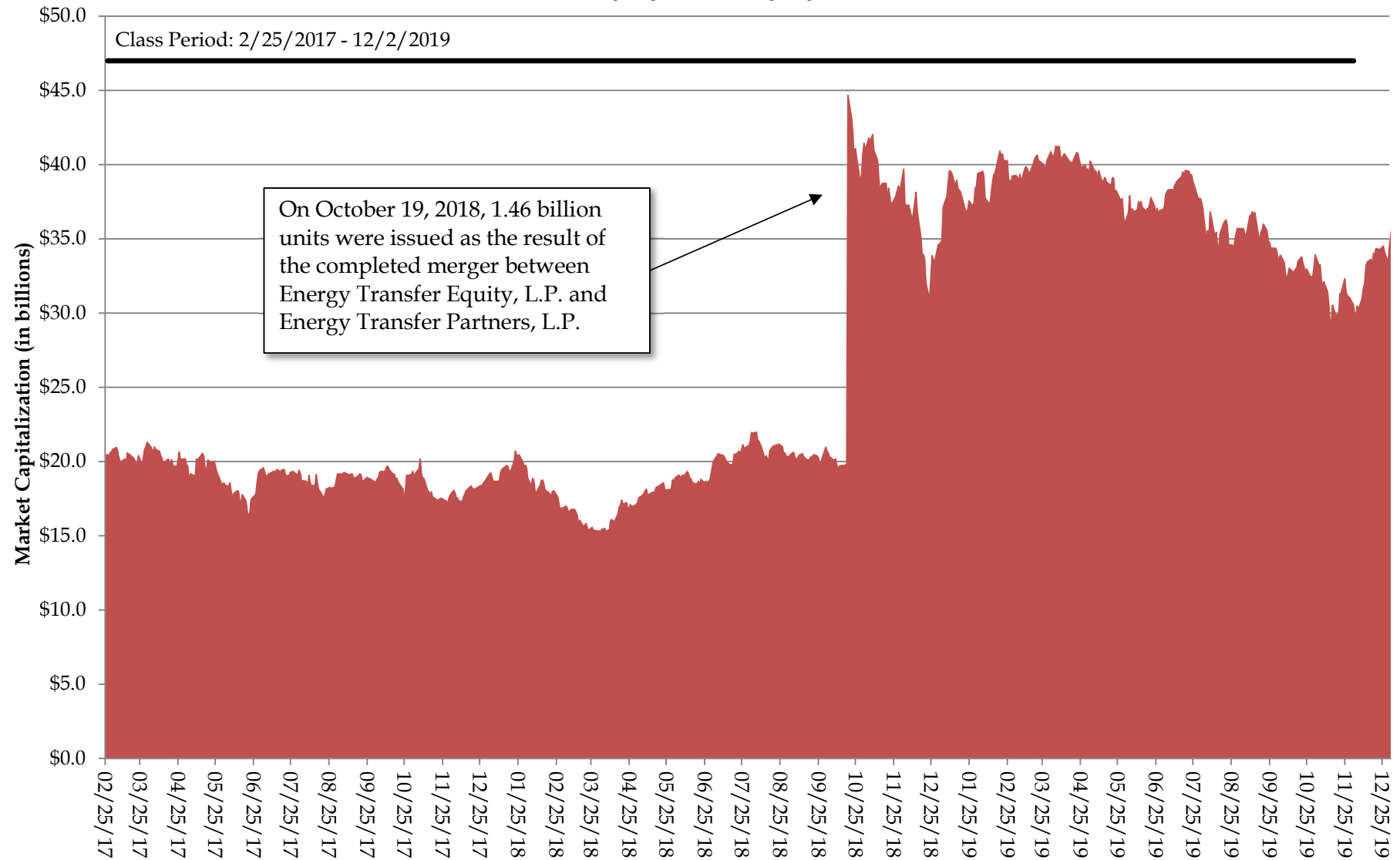
(1) Results are based on the Class Period. For the purposes of this analysis, I selected the 46 days with no news. Days with no news were days that had zero news articles via the Factiva database, and no analyst reports, SEC filings, or press releases were issued.

(2) 45.45% rate of statistical significance is statistically significantly different than 0% at the 99% confidence level using either a Chi-Square test or Fisher's Exact test.

(3) 2.73% absolute return is statistically significantly different than 0.86% based on a t-test for difference of means at the 99% confidence level.

(4) The difference between 12.2 million and 5.2 million is statistically significant at the 99% confidence level.

Exhibit 9
Energy Transfer Common Units Market Capitalization
2/25/2017 - 12/31/2019



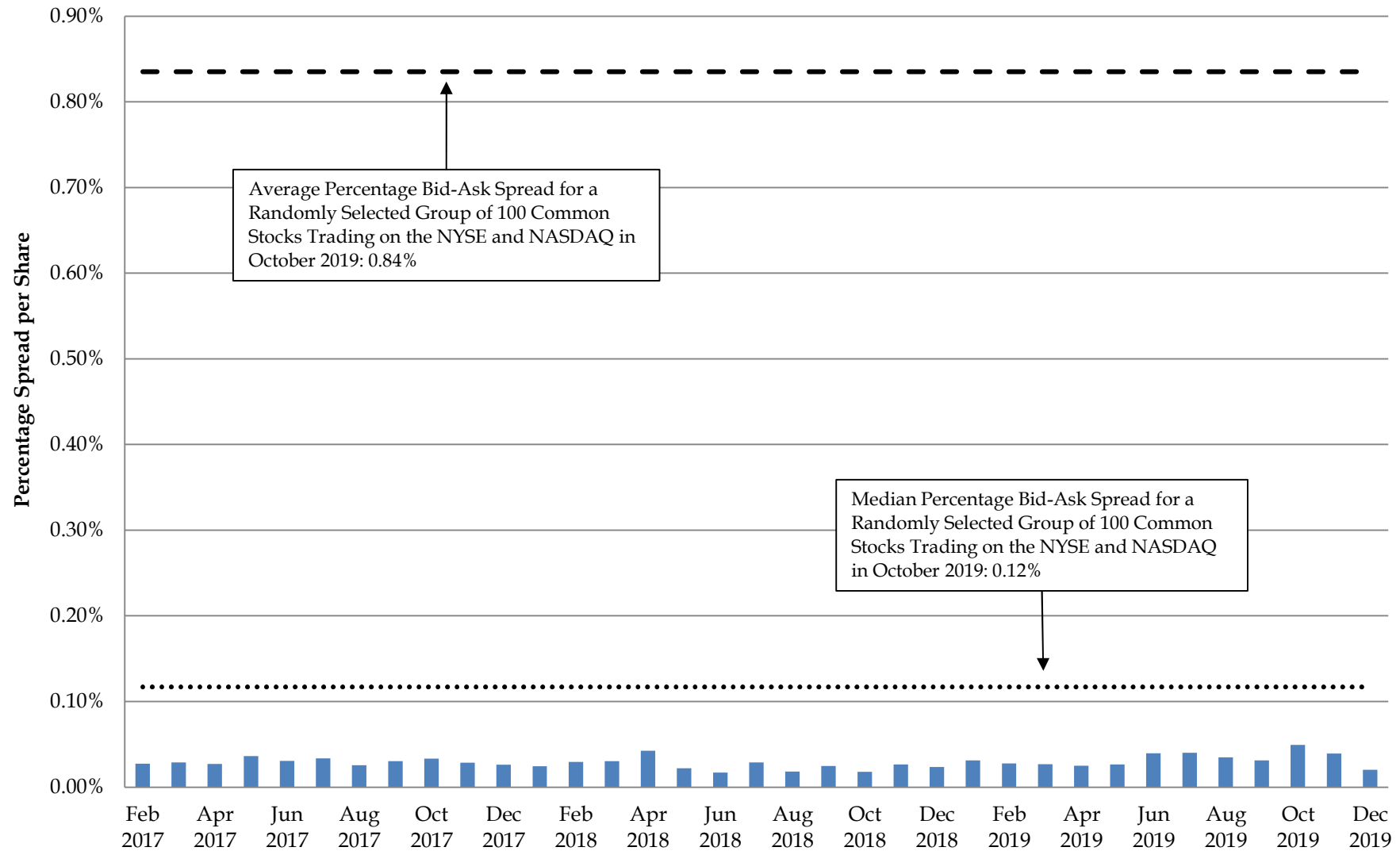
Sources: Complaint, S&P Capital IQ, and SEC Filings

Exhibit 10
Energy Transfer Common Units
Market Capitalization Rankings

Last trading day of:	Market Capitalization (billions)	Percentile Rank on NYSE & NASDAQ
Q1 2017	\$21.29	94%
Q2 2017	\$19.38	93%
Q3 2017	\$18.76	93%
Q4 2017	\$18.63	93%
Q1 2018	\$15.33	91%
Q2 2018	\$18.62	93%
Q3 2018	\$20.19	93%
Q4 2018	\$34.60	97%
Q1 2019	\$40.26	97%
Q2 2019	\$36.88	96%
Q3 2019	\$34.36	96%
Q4 2019	\$34.51	96%

Source: Bloomberg, S&P Capital IQ, and SEC Filings

Exhibit 11
Energy Transfer Common Units Average Monthly Bid-Ask Percentage Spread
2/25/2017 - 12/2/2019



Source: Thomson Reuters Eikon and TICK Data.

Note: February 2017 and December 2019 data are limited to the Class Period.

Exhibit 12
Energy Transfer Common Units Outstanding, Insider Holdings, and Institutional Holdings

Date	Units Outstanding (in 000s)	Total Institutions Owning Units	Insider Holdings (in 000s)	Short Interest (in 000s)	Public Float (in 000s)	Insider Holdings % of Units Outstanding	Total Institutional Holdings (in 000s)	Institutional Holdings % of Units Outstanding	Institutional Holdings % of Public Float
[1]	[2]	[3]	[4]	[5]	[6] = [2] + [5] - [4]	[7] = [4] / [2]	[8]	[9] = [8] / [2]	[10] = [8] / [6]
3/31/2017	1,079,100	403	289,301	59,802	849,601	26.81%	509,727	47%	60%
6/30/2017	1,079,100	403	289,301	58,135	847,933	26.81%	531,682	49%	63%
9/30/2017	1,079,185	409	289,301	54,740	844,624	26.81%	564,583	52%	67%
12/31/2017	1,079,185	433	289,164	45,670	835,691	26.79%	538,421	50%	64%
3/31/2018	1,079,146	436	286,807	26,167	818,506	26.58%	528,972	49%	65%
6/30/2018	1,079,146	438	332,801	24,626	770,970	30.84%	524,633	49%	68%
9/30/2018	1,158,207	458	348,934	38,025	847,298	30.13%	557,215	48%	66%
12/31/2018	2,619,369	790	361,668	81,259	2,338,959	13.81%	1,483,756	57%	63%
3/31/2019	2,619,391	796	360,789	93,633	2,352,235	13.77%	1,502,470	57%	64%
6/30/2019	2,619,672	781	363,307	84,866	2,341,231	13.87%	1,469,571	56%	63%
9/30/2019	2,627,000	795	366,771	106,615	2,366,843	13.96%	1,424,943	54%	60%
12/31/2019	2,689,581	851	374,058	116,278	2,431,801	13.91%	1,430,148	53%	59%
Total Institutions over Class Period:		1,222				Class Period Average:	22.01%	51.83%	63.46%

Sources: S&P Capital IQ and SEC filings.

Exhibit 13
Energy Transfer Common Units
Test for Autocorrelation During the Class Period⁽¹⁾

Quarter	Coefficient on Previous Day's Abnormal Return	t-Statistic	Significance Level ⁽²⁾
Q1 2017	-0.30	-1.45	
Q2 2017	0.16	1.24	
Q3 2017	-0.27	-2.21	**
Q4 2017	0.10	0.80	
Q1 2018	0.11	0.86	
Q2 2018	0.04	0.31	
Q3 2018	0.18	1.39	
Q4 2018	-0.18	-1.42	
Q1 2019	-0.06	-0.46	
Q2 2019	-0.07	-0.56	
Q3 2019	0.03	0.21	
Q4 2019	0.06	0.39	
Class Period	0.016	0.42	

Source: S&P Capital IQ.

Notes:

(1) For each quarter I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable.

(2) "***" Denotes statistical significance at the 99% confidence level or greater. "**" Denotes statistical significance at the 95% confidence level or greater. "*" Denotes statistical significance at the 90% confidence level or greater.

Appendix A

Documents Considered

Court Documents

- Operative Class Action Complaint for Violation of the Federal Securities Law, in *Allegheny County Employees Retirement System et al. v. Energy Transfer LP et al.*, No. 2:20-cv-00200-GAM, (E.D.PA, June 15, 2020).
- Memorandum and Order, in *Allegheny County Employees Retirement System et al. v. Energy Transfer LP et al.*, No. 20-200, (E.D.PA, April 6, 2021).

Court Decisions and Securities Law

- *Basic, Inc. v. Levinson*, 485 U.S. 224 (1988).
- Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud*, § 8.6. (Aug. 1988).
- *Cammer, et al., v. Bruce M. Bloom, et al.*, 711 F. Supp. 1264 (D.N.J. 1989).
- *Halliburton Co., et al., v. Erica P. John Fund, Inc.*, 134 S. Ct. 2398 (2014).
- *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001).
- Private Securities Litigation Reform Act of 1995, § 78u-4(e)(1).

SEC Filings

- Energy Transfer SEC Form 10-K filings submitted throughout the Class Period.
- Energy Transfer SEC Form 10-Q filings submitted throughout the Class Period.
- Energy Transfer SEC Form 8-K filings submitted during the Class Period.
- Energy Transfer SEC Forms S-3, S-3/A and S-3ASR filed on February 6, 2017, February 8, 2017, February 28, 2017 and March 3, 2017.

Security Data

- Historical data for Energy Transfer Common Units, the S&P 500 Oil, Gas & Consumable Fuels and the S&P 500 Total Return Index were obtained from S&P Capital IQ.
- Trade and quote data for Energy Transfer Common Units during the Class Period and one hundred randomly selected companies trading on the New York Stock Exchange and NASDAQ for October 2019 were obtained from Tick Data, *see* <https://tickapi.tickdata.com/>. Companies trading on the New York Stock Exchange and NASDAQ for October 2019 were identified using Thomson Reuters Eikon.
- Institutional and insider holdings data was obtained from S&P Capital IQ.
- Energy Transfer Common Units options data was obtained from iVolatility.
- Energy Transfer Common Units market makers data was obtained from Bloomberg, using the RANK function.
- Energy Transfer Common Units market capitalization percentiles were obtained from Bloomberg.
- Turnover velocity data for NYSE and NASDAQ were obtained from the World Federation of Exchanges, *see* <https://www.world-exchanges.org/home/index.php/statistics/monthly-reports>.

Energy Transfer News

- Energy Transfer news headlines and select articles downloaded from Factiva for the Class Period. The Factiva search for news over the Class Period resulted in 4,054 unique articles as a result of two searches: 1) one search for “All Sources” with the company field “Energy Transfer LP” and the keyword field “Energy Transfer Equity”, and 2) a separate search for “All Sources” with the company field “Energy Transfer LP” and the keyword field “Energy Transfer LP”. The first search was conducted for the period “February 25, 2017 – October 18, 2018, and the second search for the period “October 19, 2018 – December 2, 2019. Duplicate articles have been removed by a proprietary function accessible in Factiva’s search builder.
- Energy Transfer earnings conference call and investor call transcripts during the Class Period, including but not limited to:
 - “FQ1 2017 Earnings Call Transcripts,” *S&P Capital IQ*, May 4, 2017.
 - “FQ1 2018 Earnings Call Transcripts,” *S&P Capital IQ*, May 10, 2017.
- Energy Transfer earnings and press releases during the Class Period, including but not limited to:
 - “Energy Transfer Equity, L.P. and Energy Transfer Partners, L.P. Complete Merger, Simplify Structure”, *Business Wire*, October 19, 2019.
 - “Energy Transfer Equity Reports Second Quarter Results,” *Business Wire*, August 8, 2017.

Energy Transfer Analyst Reports

- Energy Transfer analyst reports supplied by Counsel for the period of February 25, 2017 – December 2, 2019.

Academic Articles

- Aharony, J., and Swary, I., “Quarterly Dividend and Earnings Announcements and Stockholders’ Returns: An Empirical Analysis,” *The Journal of Finance*, Vol. 35, No. 1, March 1980.
- Amihud, Y., et al., *Liquidity and Asset Prices*, 1 FOUND. & TRENDS FIN. 269 (2005).
- Avramov, D., et al., *Liquidity and Autocorrelations in Individual Stock Returns*, 61 J. FIN. (2006).
- Barber, B., et al., *The Fraud-on-the-Market Theory and the Indicators of Common Stocks’ Efficiency*, 19 J. CORP. L. 285 (1994).
- Beaver, William H., “The Information Content of Annual Earnings Announcements,” *Empirical Research in Accounting: Selected Studies, 1968*, supplement to the *Journal of Accounting Research*, Vol. 6, 1968.
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- SEC Form S-3 eligibility information from www.sec.gov/about/forms/forms-3.pdf.

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EMPLOYMENT:

Global Economics Group, LLC

President (2008 - Current)

Global Economics Group specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including litigation and policy matters throughout the world. With offices in Chicago, Boston, and New York, Principals of Global Economics Group have extensive experience in high-profile securities, antitrust, labor, and intellectual property matters.

Market Platform Dynamics, LLC

Chief Financial Officer & Chief Operating Officer (2010 – Current)

Market Platform Dynamics is a management consulting firm that specializes in assisting platform-based companies profit from industry disruption caused by the introduction of new technologies, new business models and/or new competitive threats. MPD's experts include economists, econometricians, product development specialists, strategic marketers and recognized thought leaders who apply cutting-edge research to the practical problems of building and running a profitable business.

Chicago Partners, LLC

Principal (2007 – 2008)
Vice President (2003 – 2007)
Director (2000 – 2003)
Senior Associate (1999 – 2000)
Associate (1997 – 1999)
Research Analyst (1995 – 1997)

EDUCATION:

CFA Chartered Financial Analyst, 2003

M.P.P. University of Chicago, 1997
Masters of Public Policy, with a focus in economics including coursework in Finance, Labor Economics, Econometrics, and Regulation

B.A. Knox College, 1995

Economics, Magna Cum Laude
Graduated with College Honors for Paper entitled “Increasing Efficiency in Water Supply Pricing: Using Galesburg, Illinois as a Case Study”
Dean's List Every Term
Phi Beta Kappa

PROFESSIONAL EXPERIENCE:

Securities, Valuation, and Market Manipulation Cases:

- Testifying Expert in numerous high-profile class action securities matters including, but not limited to:
 - In Re: Bank of America Corp. Securities, Derivative, and Employee Retirement Income Security Act (ERISA) Litigation. Parties settled for \$2.4 billion in which I served as Plaintiffs’ damages and loss causation expert.
 - In Re: Schering-Plough Corporation/ Enhance Securities Litigation. Parties settled for \$473 million in which I served as Plaintiffs’ damages and loss causation expert.
 - In Re: REFCO Inc. Securities Litigation. Parties settled for \$367 million in which I served as Plaintiffs’ damages and loss causation expert.
 - In Re: Computer Sciences Corporation Securities Litigation. Parties settled for \$98 million in which I served as Plaintiffs’ damages and loss causation expert.
 - Full list of testimonial experience is provided below
- Engaged several dozen times as a neutral expert by prominent mediators to evaluate economic analyses of other experts.
- Expert consultant for the American Stock Exchange (AMEX) where I evaluated issues related to multiple listing of options. Performed econometric analysis of various measures of option spread using tens of millions of trades.
- Performed detailed audit of CDO valuation models employed by a banking institution to satisfy regulators – non-litigation matter.
- Played significant role in highly-publicized internal accounting investigations of two Fortune 500 companies. One led to restatement of previously issued financial statements and both involved SEC investigations.

Testimony:

- Testifying expert in the matter of Kuo, Steven Wu v. Xceedium Inc., Supreme Court of New York, County of New York, Index No. 06-100836. Filed report re: the fair value of Mr. Kuo’s shares. Case settled at trial.

- Testifying expert in the matter of Pallas, Dennis H. v. BPRS/Chestnut Venture Limited Partnership and Gerald Nudo, Circuit Court of Cook County, Illinois, County Department, Chancery Division. Filed report re: fair value of Pallas shares. Report: July 9, 2008. Deposition August 6, 2008. Court Testimony February 11, 2009.
- Testifying expert in Washington Mutual Securities Litigation, United States District Court for the Western District of Washington at Seattle, No. 2:08-md-1919 MJP, Lead Case No. C08-387 MJP. Filed declaration August 5, 2008 re: Plaintiffs' loss causation theory. Filed expert report April 30, 2010. Filed expert rebuttal report August 4, 2010. Filed declaration re: Plan of Allocation September 25, 2011.
- Testifying expert in DVI Securities Litigation, Case No. 2:03-CV-05336-LDD, United States District Court for the Eastern District of Pennsylvania. Filed expert report October 1, 2008 re: damages. Filed expert rebuttal report December 17, 2008. Deposition January 27, 2009. Filed expert rebuttal report June 24, 2013.
- Testifying expert in Syrtech Corporation v. Lifetime Brands, Inc. and Syrtech Acquisition Corporation, Supreme Court of the State of New York, Index No. 603568/2007. Filed expert report October 31, 2008.
- Expert declaration in Jacksonville Police and Fire Pension Fund, et al. v. AIG, Inc., et al., No. 08-CV-4772-LTS; James Connolly, et al. v. AIG, Inc., et al., No. 08-CV-5072-LTS; Maine Public Employees Retirement System, et al. v. AIG, Inc., et al., No. 08-CV-5464-LTS; and Ontario Teachers' Pension Plan Board, et al. v. AIG, Inc., et al., No. 08-CV-5560-LTS, United States District Court for the Southern District of New York. Filed declaration February 18, 2009.
- Expert declaration in Connetics Securities Litigation, Case No. C 07-02940 SI, United States District Court for the Northern District of California, San Francisco Division. Filed expert report March 16, 2009. Filed declaration re: Plan of Allocation September 9, 2009.
- Testifying expert in Boston Scientific Securities Litigation, Master File No. 1:05-cv-11934 (DPW), United States District Court District of Massachusetts. Filed expert report August 6, 2009. Deposition October 6, 2009.
- Expert declaration in Louisiana Sheriffs' Pension and Relief Fund, et al. v. Merrill Lynch & Co, Inc., et al., Case Number 08-cv-09063, United States District Court for the Southern District of New York. Filed declaration re: Plan of Allocation October, 2009.
- Testifying expert in Henry J. Wojtunik v. Joseph P. Kealy, John F. Kealy, Jerry A. Kleven, Richard J. Seminoff, John P. Stephen, C. James Jensen, John P. Morbeck, Terry W. Beiriger, and Anthony T. Baumann. Filed expert report January 25, 2010.
- Testifying expert in REFCO Inc. Securities Litigation, Case No. 05 Civ. 8626 (GEL), United States District Court for the Southern District of New York. Filed expert report February 2, 2010. Filed expert rebuttal report March 12, 2010. Deposition March 26, 2010.

- Expert declaration in New Century Securities Litigation, Case No. 07-cv-00931-DDP, United States District Court Central District of California. Filed declaration March 11, 2010.
- Testifying expert in Louisiana Municipal Police Employees' Retirement System, et al. v. Tilman J. Fertitta, Steven L. Scheinthal, Kenneth Brimmer, Michael S. Chadwick, Michael Richmond, Joe Max Taylor, Fertitta Holdings, Inc., Fertitta Acquisition Co., Richard Liem, Fertitta Group, Inc. and Fertitta Merger Co, C.A. No. 4339-VCL, Court of Chancery of the State of Delaware. Filed expert report April 23, 2010.
- Testifying expert in Edward E. Graham and William C. Nordlund, individually and d/b/a Silver King Capital Management v. Eton Park Capital Management, L.P., Eton Park Associates, L.P. and Eton Park Fund, L.P. Case No. 1:07-CV-8375-GBD, Circuit Court of Shelby County, Alabama. Filed expert rebuttal report July 8, 2010. Deposition September 1, 2010. Filed supplemental expert rebuttal report August 22, 2011.
- Testifying expert in Moody's Corporation Securities Litigation. Case No. 1:07-CV-8375-GBD, United States District Court for the Southern District of New York. Filed expert rebuttal report August 23, 2010. Deposition October 7, 2010. Filed rebuttal reply report November 5, 2010. Filed expert report May 25, 2012.
- Testifying expert in Minneapolis Firefighters' Relief Association v. Medtronic, Inc., et al. Civil No. 08-6324 (PAM/AJB), United States District Court, District of Minnesota. Filed expert report January 14, 2011.
- Testifying expert in Schering-Plough Corporation/ENHANCE Securities Litigation Case No.2:08-cv-00397 (DMC) (JAD), United States District Court, District of New Jersey. Filed declaration February 7, 2011. Filed expert report September 15, 2011. Filed expert rebuttal report October 28, 2011. Filed declaration January 30, 2012. Deposition November 15, 2011 and November 29, 2011.
- Testifying expert in Fannie Mae 2008 Securities Litigation, Master File No. 08 Civ. 7831 (PAC), United States District Court for the Southern District of New York. Filed expert report July 18, 2011.
- Expert declaration in Grady Scott Weston et. al v. RCS Capital Corporation, et. al, Civil Action No. 1:14-CV-10136-GBD, United States District Court for the Southern District of New York. Filed declaration re: aggregate damages August 11, 2017.
- Testifying expert in Bank of America Corp. Securities, Derivative, and Employee Retirement Income Security Act (ERISA) Litigation, Master File No. 09 MDL 2058 (PKC), United States District Court for the Southern District of New York. Filed expert report August 29, 2011. Filed expert rebuttal report September 26, 2011. Filed expert report March 16, 2012. Filed expert rebuttal report April 9, 2012. Filed expert rebuttal report April 29, 2012. Deposition October 14, 2011 and May 24, 2012.
- Testifying expert in Toyota Motor Corporation Securities Litigation, Case No. 10-922 DSF (AJWx), United States District Court, Central District of California. Filed expert report February

17, 2012. Deposition March 28, 2012. Filed expert rebuttal report August 2, 2012. Filed declaration re: Plan of Allocation January 28, 2013.

- Testifying expert in The West Virginia Investment Management Board and the West Virginia Consolidated Public Retirement Board v. The Variable Annuity Life Insurance Company, Civil No. 09-C-2104, Circuit Court of Kanawha County, West Virginia. Filed expert report June 1, 2012. Depositions June 19, 2013 and December 11, 2015.
- Testifying expert in Aracruz Celulose S.A. Securities Litigation, Case No. 08-23317-CIV-LENARD, United States District Court for the Southern District of Florida. Filed expert report July 20, 2012. Deposition September 14, 2012. Filed expert rebuttal report October 29, 2012. Filed declaration re: Plan of Allocation May 20, 2013.
- Testifying expert in In Re Computer Sciences Corporation Securities Litigation, CIV. A. No. 1:11-cv-610-TSE-IDD, United States District Court for the Eastern District of Virginia, Alexandria Division. Filed expert report November 9, 2012. Filed supplemental report February 18, 2013. Filed expert rebuttal report March 25, 2013. Deposition March 27, 2013. Filed declaration re: Plan of Allocation August 7, 2013.
- Testifying expert in In Re Weatherford International Securities Litigation, Case 1:11-cv-01646-LAK, United States District Court for the Southern District of New York. Filed declaration July 1, 2011. Filed expert report April 1, 2013. Deposition April 26, 2013.
- Testifying expert in In Re: Regions Morgan Keegan Closed-End Fund Litigation, Case 2:07-cv-02830-SHM-dkv, United States District Court for the Western District of Tennessee, Western Division. Court testimony April 12, 2013.
- Testifying expert in City of Roseville Employees' Retirement System and Southeastern Pennsylvania Transportation Authority, derivatively on behalf of Oracle Corporation, Plaintiff, v. Lawrence J. Ellison, Jeffrey S. Berg, H. Raymond Bingham, Michael J. Boskin, Safra A. Catz, Bruce R. Chizen, George H. Conrades, Hector Garcia-Molina, Donald L. Lucas, and Naomi O. Seligman, Defendants, and Oracle Corporation, Nominal Defendant, C.A. No. 6900-CS, Court of Chancery of the State of Delaware. Filed expert report May 13, 2013. Filed expert rebuttal report June 21, 2013. Deposition July 17, 2013.
- Testifying expert in In Re BP plc Securities Litigation, No. 4:10-md-02185, Honorable Keith P. Ellison, United States District Court for the Southern District of Texas, Houston Division. Filed expert report June 14, 2013. Deposition July 25, 2013. Filed expert rebuttal report October 7, 2013. Filed declaration re: Plaintiff accounting losses November 17, 2013. Filed expert report January 6, 2014. Deposition January 22, 2014. Filed expert rebuttal report March 12, 2014. Filed expert report March 17, 2014. Hearing testimony April 21, 2014. Deposition June 3, 2014. Filed declaration re: damages June 3, 2014.
- Testifying expert in In Re Celestica Inc. Securities Litigation, Civil Action No. 07-CV-00312-GBD, United States District Court for the Southern District of New York. Filed expert report June 14, 2013. Filed expert rebuttal report September 10, 2013. Deposition September 24, 2013.

- Testifying expert in In Re Dendreon Corporation Class Action Litigation, Master Docket No. C11-01291JLR, United States District Court for the Western District of Washington at Seattle. Filed declaration re: Plan of Allocation June 14, 2013.
- Testifying expert in In Re Hill v. State Street Corporation, Master Docket No. 09-cv12146-GAO, United States District Court for the District of Massachusetts. Filed expert report October 28, 2013.
- Testifying expert in In Re BNP Paribas Mortgage Corporation and BNP Paribas v. Bank of America, N.A., Master Docket No. 09-cv-9783-RWS, United States District Court for the Southern District of New York. Filed expert report November 25, 2013. Filed expert rebuttal report March 17, 2014. Deposition June 26-27, 2014.
- Testifying expert in Stan Better and YRC Investors Group v. YRC Worldwide Inc., William D. Zollars, Michael Smid, Timothy A. Wicks and Stephen L. Bruffet, Civil Action No. 11-2072-KHV, United States District Court for the District of Kansas. Filed declaration re: Plan of Allocation February 5, 2014. Filed expert report May 29, 2015. Filed expert report February 5, 2016. Filed expert rebuttal report March 27, 2016.
- Testifying expert in The Archdiocese of Milwaukee Supporting Fund v. Halliburton Company, et al., Civil Action No. 3:02-CV-1152-M, United States District Court for the Northern District of Texas, Dallas Division. Filed expert rebuttal report October 30, 2014. Deposition November 11, 2014. Hearing testimony December 1, 2014. Filed expert report March 11, 2016. Filed expert rebuttal report May 13, 2016. Deposition June 10, 2016. Hearing testimony re: Plan of Allocation July 31, 2017.
- Testifying expert in In Re HP Securities Litigation, Master File No. 3:12-cv-05980-CRB, United States District Court for the Northern District of California, San Francisco Division. Filed expert report November 4, 2014. Deposition December 3, 2014. Filed expert rebuttal report January 26, 2015.
- Testifying expert in In Re MGM Mirage Securities, No. 2:09-cv-01558-GMN-VCF, United States District Court for the District of Nevada. Filed expert report November 12, 2014. Deposition January 6, 2015. Filed expert rebuttal report April 2, 2015.
- Testifying expert in Adam S. Levy v. Thomas Gutierrez, Richard J. Gaynor, Raja Bal, J. Michal Conaway, Kathleen A. Cote, Ernest L. Godshalk, Matthew E. Massengill, Mary Petrovich, Robert E. Switz, Noel G. Watson, Thomas Wroe, Jr., Morgan Stanley & Co. LLC, Goldman, Sachs & Co., and Canaccord Genuity Inc. and Apple Inc., No. 1:14-cv-00443-JL, United States District Court for the District of New Hampshire. Filed declaration January 7, 2015. Filed expert report September 20, 2018. Deposition December 7, 2018. Filed expert rebuttal report February 22, 2019. Filed expert report June 7, 2019. Deposition September 6, 2019.
- Testifying expert in In Re Nu Skin Enterprises, Inc., Securities Litigation, Master File No. 2:14-cv-00033-DB, United States District Court for the District of Utah, Central Division. Filed expert

report June 26, 2015. Deposition August 17, 2015.

- Testifying expert in In Re Intuitive Surgical Securities Litigation, Master File No. 5:13-cv-01920-EJD, United States District Court for the Northern District of California. Filed expert report September 1, 2015. Filed expert rebuttal report November 16, 2015. Filed expert report November 8, 2016. Filed expert report February 8, 2017. Deposition December 12, 2017.
- Testifying expert in Babak Hatamian, et al., v. Advanced Micro Devices, Inc., et al., No. 4:14-cv-00226-YGR, United States District Court for the Northern District of California, San Francisco Division. Filed expert report September 4, 2015. Filed expert rebuttal report December 7, 2015. Filed expert report November 18, 2016. Filed expert rebuttal report January 17, 2017. Filed declaration March 6, 2017. Deposition March 7, 2017.
- Testifying expert in In Re NII Holdings, Inc. Securities Litigation, No. 1:14-cv-00227-LMB-JFA, United States District Court for the Eastern District of Virginia, Alexandria Division. Filed expert report September 11, 2015. Deposition September 17, 2015. Filed expert rebuttal report October 28, 2015. Filed expert report January 8, 2016.
- Testifying expert in In Re Barrick Gold Securities Litigation, No. 1:13-cv-03851-SAS, United States District Court for the Southern District of New York. Filed expert report September 15, 2015.
- Expert declaration in In Re Tower Group International, Ltd. Securities Litigation, Master Docket No. 1:13-cv-5852-AT, United States District Court for the Southern District of New York. Filed declaration re: Plan of Allocation October 6, 2015.
- Testifying expert in Beaver County Employees' Retirement Fund et al. v. Tile Shop Holdings Inc. et al., No. 0:14-cv-00786-ADM-TNL, United States District Court for the District of Minnesota. Filed expert report December 1, 2015. Deposition March 15, 2016. Filed expert report July 1, 2016. Deposition July 26, 2016. Filed expert reply report August 15, 2016.
- Testifying expert in In Re Barclays Bank PLC Securities Litigation, Civil Action No. 1:09-cv-01989-PAC, United States District Court for the Southern District of New York. Filed expert report December 15, 2015. Filed expert rebuttal report February 2, 2016. Filed rebuttal reply expert report March 18, 2016. Deposition April 21, 2016.
- Testifying expert in In Re Petrobras Securities Litigation, Civil Action No. 15-cv-03733-JSR, 15-cv-07615-JSR, 15-cv-6618-JSR, 15-cv-02192-JSR, United States District Court for the Southern District of New York. Filed expert report May 6, 2016. Filed expert report May 27, 2016. Filed expert reply report June 17, 2016. Deposition June 24, 2016.
- Testifying expert in In Re Genworth Financial, Inc. Securities Litigation, Civ. A. No. 3:14-cv-00682-JAG, United States District Court for the Eastern District of Virginia, Richmond Division. Filed declaration re: Plan of Allocation June 2, 2016.

- Testifying expert in Zubair Patel, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. L-3 Communications Holdings, Inc., et al., Defendants, No. 1:14-cv-06038-VEC, United States District Court for the Southern District of New York. Filed expert report June 30, 2016. Deposition July 20, 2016. Filed expert rebuttal report August 26, 2016.
- Testifying expert in Leonard Howard, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Liquidity Services, Inc., et al., Defendants, No. 1:14-cv-01183-BAH, United States District Court for the District of Columbia. Filed expert report September 2, 2016.
- Testifying expert in James Quinn, Derivatively on Behalf of Nominal Defendant Apple REIT Ten, Inc., Plaintiff, v. Glade M. Knight, Justin Knight, Kent W. Colton, R. Garnett Hall, Jr., David J. Adams, Anthony F. Keating III, David Buckley, Kristian Gathright, David McKenney, Bryan Peery, and Apple Hospitality REIT, Inc., Defendants, and Apple REIT Ten, Inc., Nominal Defendant, No. 3:16-cv-610, United States District Court for the Eastern District of Virginia, Richmond Division. Filed expert report October 14, 2016. Deposition October 20, 2016.
- Testifying expert in Dr. Joseph F. Kasper, et al., Plaintiff, v. AAC Holdings, Inc., et al., Defendants, No. 3:15-cv-00923, United States District Court for the Middle District of Tennessee, Nashville Division. Filed expert report October 18, 2016. Deposition November 29, 2016. Filed expert rebuttal report February 10, 2017. Filed expert report December 4, 2017.
- Testifying expert in KBC Asset Management NV, et al., Plaintiff, v. 3D Systems Corporation, Abraham N. Reichental, Damon J. Gregoire, and Ted Hull, Defendants, No. 15-cv-02393-MGL, United States District Court for the District of South Carolina, Rock Hill Division. Filed expert report October 31, 2016. Deposition January 5, 2017. Filed expert report April 21, 2017.
- Testifying expert in Arkansas Teacher Retirement System, et al., Plaintiff, v. Virtus Investment Partners, Inc., Defendants, No. 15-cv-1249-WHP, United States District Court for the Southern District of New York. Filed expert report November 7, 2016. Filed expert rebuttal report February 17, 2017. Deposition February 28, 2017. Filed expert report June 16, 2017. Filed expert rebuttal report July 26, 2017. Deposition August 9, 2017. Filed declaration re: prior reports December 4, 2017.
- Testifying expert in Laborers Pension Trust Fund – Detroit, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, vs. Conn’s, Inc., et al., Defendants, No. 4:14-cv-00548 (KPE), United States District Court for the Southern District of Texas, Houston Division. Filed expert report November 10, 2016. Deposition December 9, 2016. Filed expert rebuttal report March 27, 2017.
- Testifying expert in Glen Hartsock, individually and on behalf of all others similarly situated Plaintiff, v. Spectrum Pharmaceuticals, Inc., and Rajesh C. Shrotriya, Defendants, No. 16-cv-02279-RFB-GWF and Olutayo Ayeni, individually and on behalf of all others similarly situated Plaintiff, v. Spectrum Pharmaceuticals, Inc., Rajesh C. Shrotriya, Kurt A. Gustafson, Joseph Turgeon, and Lee Allen, Defendants, No. 16-cv-02649-KJD-VCF, United States District Court for the District of Nevada. Filed declaration re: damages December 8, 2016.

- Testifying expert in In Re: ARIAD Pharmaceuticals, Inc. Securities Litigation, No. 1:13-cv-12544 (WGY), United States District Court District of Massachusetts. Filed expert report March 6, 2017.
- Testifying expert in Washtenaw County Employees' Retirement System, individually and on behalf of all others similarly situated, Plaintiff, v. Walgreen Co., Gregory D. Wasson, and Wade Miquelon, Defendants, No. 15-cv-3187, United States District Court for the Northern District of Illinois. Filed expert report April 21, 2017. Deposition June 15, 2017. Filed expert rebuttal report September 15, 2017. Filed expert report November 11, 2020. Filed expert rebuttal report December 14, 2020. Deposition January 29, 2021.
- Testifying expert in Lou Baker, individually and on behalf of all others similarly situated, Plaintiff, v. SeaWorld Entertainment, Inc., James Atchison, James M. Heaney, Marc Swanson, and The Blackstone Group L.P., Defendants, No. 3:14-cv-02129-MMA-KSC, United States District Court for the Southern District of California. Filed expert report May 19, 2017. Deposition July 20, 2017. Filed expert rebuttal report September 14, 2017. Filed expert report January 22, 2019. Filed expert rebuttal report March 1, 2019. Deposition March 26, 2019.
- Testifying expert in Benjamin Gross, individually and on behalf of all others similarly situated, Plaintiff, v. GFI Group, Inc., Colin Heffron, and Michael Gooch, Defendants, No. 3:14-cv-09438-WHP, United States District Court for the Southern District of New York. Filed expert report May 30, 2017. Filed expert report August 7, 2017. Filed expert rebuttal report August 28, 2017. Deposition September 27, 2017.
- Testifying expert in Murray Rubinstein, Jeffrey F. St. Clair, William McWade, Harjot Dev and Vikas Shah, individually and on behalf of all others similarly situated, Plaintiffs, v. Richard Gonzalez and Abbvie Inc., Defendants, No. 14-cv-9465, United States District Court for the Northern District of Illinois, Eastern Division. Filed expert report December 21, 2017. Deposition February 22, 2018. Filed supplemental expert report March 9, 2018. Filed expert reply report June 14, 2018. Filed expert sur-sur reply report August 28, 2018.
- Testifying expert in In Re: SanDisk LLC Securities Litigation, No. 3:15-cv-01455-VC, United States District Court for the Northern District of California, San Francisco Division. Filed expert report January 19, 2018. Deposition January 31, 2018. Filed expert report August 30, 2018. Filed expert report October 23, 2018. Deposition November 15, 2018. Filed declaration re: Plan of Allocation and calculation of aggregate damages May 6, 2019.
- Testifying expert in In Re: EZCORP, Inc. Securities Litigation, No. 1:15-cv-00608-SS, United States District Court for the Western District of Texas. Filed expert report January 31, 2018. Deposition March 6, 2018.
- Testifying expert in Kevin Murphy, Individually and On Behalf of All Others Similarly Situated, Plaintiff, v. Precision Castparts Corp., Mark Donegan, and Shawn R. Hagel, Defendants, No. 3:16-cv-00521-SB, United States District Court for the District of Oregon, Portland Division. Filed expert report March 2, 2018. Filed expert report March 22, 2019. Filed expert reply report June 19, 2019. Deposition July 19, 2019.

- Testifying expert in In Re: Rent-A-Center, Inc. Securities Litigation, No. 4:16-cv-00978-ALM-CMC, United States District Court for the Eastern District of Texas, Sherman Division. Filed expert report March 13, 2018. Filed rebuttal reply report July 12, 2018. Deposition August 21, 2018.
- Testifying expert in Public Employees' Retirement Systems of Mississippi, Individually and On Behalf of All Others Similarly Situated, Plaintiff, v. TreeHouse Foods, Inc., Sam K. Reed, Dennis F. Riordan and Christopher D. Silva, Defendants, No. 1:16-cv-10632, United States District Court for the Northern District of Illinois. Filed expert report July 13, 2018. Deposition September 21, 2018. Filed rebuttal reply report May 17, 2019.
- Testifying expert in Gary Hefler, et al., Plaintiffs, v. Wells Fargo & Company, et al., Defendants, No. 1:16-cv-05479-JST, United States District Court for the Northern District of California. Filed declaration re: Plan of Allocation July 27, 2018.
- Testifying expert in In re Banco Bradesco S.A. Securities Litigation, No. 1:16-cv-04155-GHW, United States District Court for the Southern District of New York. Filed expert report August 17, 2018. Filed supplemental expert report October 11, 2018. Deposition October 12, 2018. Filed expert report December 14, 2018. Filed expert report March 8, 2019. Filed declaration re: Plan of Allocation July 19, 2019.
- Testifying expert in Richard Di Donato, et al., Plaintiffs, v. Insys Therapeutics Incorporated, et al. Defendants, No. CV-16-00302-PHX-NVW, United States District Court for the District of Arizona. Filed expert report August 31, 2018. Deposition October 4, 2018. Filed expert report November 30, 2018. Filed expert report July 26, 2019. Filed expert report November 1, 2019.
- Consulting expert in In Re: Wilmington Trust Securities Litigation, Master File No. 10-cv-00990-ER, United States District Court for the District of Delaware. Filed declaration re: Plan of Allocation and calculation of aggregate damages September 17, 2018.
- Testifying expert in Atul Singh Deora, Individually and On Behalf of All Others Similarly Situated, Plaintiffs, v. Nanthealth, Inc., Patrick Soon-Shiong, Paul A. Holt, Michael S. Sitrick, Kirck K. Calhoun, Mark Bennett, Edward Miller, Michael Blaszyk, Jefferies Llc, First Analysis Securities Corporation, Canaccord Genuity Inc., And Fbr Capital Markets & CO., Defendants., No. 2:17-CV-01825-BRO-MRW, United States District Court for the Central District of California Western Division. Filed expert report September 20, 2018.
- Testifying expert in City of Sunrise General Employees' Retirement Plan, Plaintiff vs. FleetCor Technologies, Inc., et al., Defendants, No. 1:17-CV-02207-LMM, United States District Court for the Northern District of Georgia Atlanta Division. Filed expert report January 4, 2019. Deposition March 20, 2019. Filed expert report May 6, 2019.
- Testifying expert in Guevoura Fund LTD., On Behalf of Itself and All Others Similarly Situated, Plaintiffs, v. Robert F.X. Sillerman, D. Geoffrey Armstrong, John Miller, Michael John Meyer, and SFX Entertainment, Inc., Defendants, Case No. 1:15-cv-07192-CM, Case No. 1:18-cv-09784-CM,

United States District Court for the Southern District of New York. Filed expert report January 18, 2019.

- Testifying expert in Leon D. Milbeck On Behalf of Himself and All Others Similarly Situated, v. TrueCar, Inc, et al., Defendants, No. 2:18-cv-02612-SVW, United States District Court for the Central District of California. Filed expert report March 8, 2019. Deposition April 8, 2019.
- Testifying expert in Lewis Cosby, Kenneth R. Martin, as Beneficiary of the Kenneth Ray Martin Roth IRA, and Martin Weakly On Behalf of Themselves and All Others Similarly Situated, vs. KPMG, LLP, Case No. 3:16-cv-00121, United States District Court for the Eastern District of Tennessee, Knoxville Division. Filed expert report March 15, 2019. Deposition April 12, 2019. Filed supplemental expert report April 19, 2019. Deposition April 25, 2019. Filed rebuttal reply report June 14, 2019.
- Testifying expert in Shawn Sanawaz, Individually and On Behalf of All Other Similarly Situated, v. Intellipharma International Inc., Isa Odidi, and Domenic Della Penna, Defendants, No. 1:17-cv-05761-JPO, United States District Court for the Southern District of New York. Filed expert report May 06, 2019.
- Testifying expert in Kevin L. Dougherty, Individually and on Behalf of All Others Similarly Situated, v. Esperion Therapeutics, Inc., et al., Defendants, No. 2:16-cv-10089-AJT-RSW, United States District Court for the Eastern Michigan of Michigan. Filed expert report June 6, 2019. Deposition July 26, 2019. Filed rebuttal reply report October 7, 2019. Filed expert report May 15, 2020. Deposition July 31, 2020.
- Testifying expert in West Virginia Investment Management Board, Stichting Blue Sky Global Equity Active Low Volatility Fund, and Stichting Blue Sky Active Large Cap Equity USA Fund vs. SCANA Corporation., et al., Civ. A. No. 3:17-cv-2616-MBS, United States District Court for the District of South Carolina. Filed expert report June 28, 2019. Deposition August 16, 2019.
- Testifying expert in Eric Weiner, Individually and on Behalf of All Others Similarly Situated, vs. Tivity Health, Inc., Donato Tramuto, Glenn Hargreaves and, Adam Holland, Defendants, Case No.: 3:17-cv-01469 United States District Court for the Middle District of Tennessee. Filed expert report July 1, 2019. Deposition September 4, 2019. Filed rebuttal reply report December 20, 2019. Filed expert report July 30, 2020. Filed rebuttal reply report September 30, 2020. Deposition October 22, 2020.
- Testifying expert in In Re Dr. Reddy's Laboratories Limited Securities Litigation, No. 3:17-cv-06436-PGS-DEA, United States District Court for the District of New Jersey. Filed expert report July 19, 2019. Deposition September 10, 2019.
- Testifying expert in Peace Officers' Annuity and Benefit Fund of Georgia, Individually and On Behalf of All Others Similarly Situated, and Jacksonville Police and Fire Pension Fund, Individually and On Behalf of All Others Similarly Situated vs. DaVita, Inc. et al., No. 1:17-cv-00304-WJM-NRN, United States District Court for the District of Colorado. Filed expert report January 31, 2020. Deposition May 27, 2020.

- Testifying Expert in In Re Avon Securities Litigation, No. 19 Civ. 01420- CM, United States District Court for the Southern District of New York. Filed expert report February 13, 2020.
- Testifying Expert in In Re Allergan Generic Drug Pricing Securities Litigation, Civil Action No. 2:16-9449 (KSH) (CLW), United States District Court for the District of New Jersey. Filed expert report March 20, 2020. Deposition July 16, 2020. Filed expert reply report November 25, 2020.
- Expert declaration in Martin Cohen, Individually and On Behalf of All Others Similarly Situated, v. Luckin Coffee Inc., Jenny Zhiya Qian, and Reinout Hendrik Schakel, Case no. 1:20-cv-01293-LJL, United States District Court for the Southern District of New York. Filed declaration May 13, 2020.
- Testifying Expert in In RE Navient Corporation Securities Litigation, No. 1:17-cv-08373-RBK-AMD, United States District Court of New Jersey. Filed expert report May 15, 2020. Deposition July 23, 2020. Filed declaration August 21, 2020. Filed expert report April 16, 2021. Deposition June 3, 2021.
- Testifying Expert in Yellowdog Partners, LP, Individually and on Behalf of All Others Similarly Situated, vs. CURO Group Holdings Corp., et al., Civil Action No. 2:18-cv-02662-JWL-KGG, United States District Court for the District of Kansas, Kansas City. Filed expert report May 18, 2020.
- Testifying Expert in Julian Keippel, Individually and On Behalf of All Others Similarly Situated, vs. Health Insurance Innovations, Inc., Gavin Southwell, and Michael D. Hershberger, No. 8:19-CV-00421-WFJ-CPT, United States District Court Middle District of Florida Tampa Division. Filed expert report May 21, 2020. Deposition June 15, 2020.
- Testifying Expert in In Re Perrigo Company plc Securities Litigation, No: 1:19-cv-00070-DLC, United States District Court for the Southern District of New York. Filed expert report July 10, 2020. Deposition August 4, 2020. Filed expert report October 6, 2020. Filed expert rebuttal reply report December 4, 2020. Deposition March 4, 2021.
- Testifying Expert in Plymouth County Retirement System, Individually and On Behalf of All Others Similarly Situated, vs. GTT Communications, Inc., Richard D. Calder, Jr., Chris Mckee, Michael Sicoli, And Gina Nomellini, Case No. 1:19-cv-00982-CMH-MSN, United States District Court for the Eastern District of Virginia Alexandria Division. Filed expert report August 7, 2020. Filed expert report September 25, 2020.
- Testifying Expert in Thomas W. Luczak, Individually and On Behalf of All Others Similarly Situated, vs. National Beverage Corp., Nick A. Caporella, and George R. Bracken, Case No. 0:18-cv-61631-KMM, United States District Court for the Southern District of Florida. Filed expert report September 25, 2020. Deposition November 5, 2020.

- Expert declaration in In re: PG&E Corporation – and – Pacific Gas and Electric Company Debtors, Case No. 19-30088 (DM), United States Bankruptcy Court for the Northern District of California, San Francisco Division. Filed declaration September 28, 2020.
- Testifying Expert in Oklahoma Police Pension Fund and Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Teligent, Inc. and Jason Grenfell-Gardner, Defendants, Case No. 1:19-cv-03354-VM, United States District Court for the Southern District of New York. Filed expert report September 30, 2020. Deposition March 11, 2021.
- Testifying Expert in John Utesch, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Lannett Company, Inc., Arthur P. Bedrosian, and Martin P. Galvan, Defendants, Civil Action No. 2:16-cv-05932-WB, United States District Court for the Eastern District of Pennsylvania. Filed expert report October 1, 2020. Deposition December 10, 2020. Filed expert rebuttal report on May 13, 2021. Hearing testimony July 27, 2021.
- Testifying Expert in City of Warren Police and Fire Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. World Wrestling Entertainment, Inc., Vincent K. McMahon, George A. Barrios and Michelle D. Wilson, Defendants, Civil Action No. 1:20-cv-02031-JSR, United States District Court for the Southern District of New York. Filed expert report on October 6, 2020. Deposition October 14, 2020.
- Testifying Expert in Employees' Retirement System of the Puerto Rico Electric Power Authority, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Conduent Inc., Ashok Vemuri, and Brian Webb-Walsh, Defendants, Case No. 2:19-cv-08237-SDW, United States District Court for the District of New Jersey. Filed expert report on December 7, 2020. Deposition December 22, 2020.
- Testifying Expert in The Police Retirement System of St. Louis, Individually and On Behalf of All Others Similarly Situated, Plaintiff, v. Granite Construction Incorporated, James H. Roberts, Jigisha Desai, and Laurel J. Krzeminski, Defendants, Case No. 3:19-cv-04744-WHA, United States District Court for the Northern District of California. Filed expert report on November 25, 2020. Filed declaration re: Plan of Allocation May 25, 2021.
- Testifying Expert in Plumbers & Pipefitters National Pension Fund and Juan Francisco Nieves, as Trustee of the Gonzalez Coronado Trust, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, v. Kevin Davis and Amir Rosenthal (Performance Sports Group Ltd.), Defendants, Case No.: 1:16-CV-3591-GHW, United States District Court for the Southern District of New York. Filed expert report on December 18, 2020. Deposition February 5, 2021. Filed expert rebuttal report on April 6, 2021.
- Testifying Expert in Mayuko Holwill, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. AbbVie Inc., Richard A. Gonzalez, and William J. Chase, Defendants, Case No. 1:18-cv-6790, United States District Court for the Northern District of Illinois. Filed expert report on February 1, 2021.

- Testifying Expert in Oklahoma Firefighters Pension and Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Newell Brands Inc., Michael B. Polk, John K. Stipancich, Scott H. Garber, Bradford R. Turner, Michael T. Cowhig, Thomas E. Clarke, Kevin C. Conroy, Scott S. Cowen, Domenico De Sole, Cynthia A. Montgomery, Christopher D. O’Leary, Jose Ignacio Perez-Lizaur, Steven J. Strobel, Michael A. Todman, and Raymond G. Viault, Defendants, Case No: HUD-L-3492-18, Superior Court of New Jersey Law Division (Hudson County). Filed expert report on May 3, 2021. Filed expert rebuttal report on June 15, 2021. Deposition July 21, 2021.
- Testifying Expert in Carmignac Gestion, S.A., Mason Capital L.P., et al., Pentwater Equity Opportunities Master Fund LTD., et al., First Manhattan Co., Nationwide Mutual Funds, on behalf of its series Nationwide S&P 500 Index Fund, et. al., WCM Alternatives: Event-Driven Fund, et al., Hudson Bay Master Fund LTD., et al., Schwab Capital Trust on behalf of its series Schwab S&P 500 Index Fund, et al., Sculptor Master Fund, LTD. f/k/a OZ Master Fund, Ltd., et al., Aberdeen Canada Funds – Global Equity Fund, a series of Aberdeen Canada Funds, et al., Discovery Global Citizens Master Fund, LTD., et al., York Capital Management, L.P., et al., Burlington Loan Management DAC, Universities Superannuation Scheme LTD., Principal Funds, Inc., et al., Kuwait Investment Authority et al., Blackrock Global Allocation Fund, et al., Plaintiffs, vs. Perrigo Company PLC, et al, Defendants, Civil Action No(s): 17-10467 (MCA) (LDW), 18-1119 (MCA) (LDW), 18-1121 (MCA) (LDW), 18-2291 (MCA) (LDW), 18-15382 (MCA) (LDW), 18-16204 (MCA) (LDW), 18-16206 (MCA) (LDW), 19-3973 (MCA) (LDW), 19-4900 (MCA) (LDW), 19-6560 (MCA) (LDW), 19-21502 (MCA) (LDW), 19-21732 (MCA) (LDW), 20-1484 (MCA) (LDW), 20-2262 (MCA) (LDW), 20-2410 (MCA) (LDW), 20-3431 (MCA) (LDW), 20-4748 (MCA) (LDW), United States District Court for the District of New Jersey. Filed expert report on June 23, 2021.
- Testifying Expert in In Re Nielsen Holdings PLC Securities Litigation, Case No. 18-CV-07143-JMF, United States District Court Southern District of New York. Filed expert report on July 14, 2021.

Experience in Labor Economics and Discrimination-Related Cases:

- Expert consultant for Cargill in class action race discrimination matter in which class certification was defeated.
- Expert consultant for 3M in class action age discrimination matter.
- Expert consultant for Wal-Mart in class action race discrimination matter.
- Expert consultant on various other significant confidential labor economics matters in which there were class action allegations related to race, age and gender.
- Expert consultant for large insurance company related to litigation and potential regulation resulting from the use of credit scores in the insurance underwriting process.

Testimony:

- Testifying expert in Shirley Cohens v. William Henderson, Postmaster General, C.A 1:00CV-1834 (TFH) United States Postal Service. United States District Court for the District of Columbia.– Filed report re: lost wages and benefits.
- Testifying expert in Richard Akins v. NCR Corporation. Before the American Arbitration Association – Filed report re: lost wages.
- Testifying expert in Maureen Moriarty v. Dyson, Inc., Case No. 09 CV 2777, United States District Court for the Northern District of Illinois, Eastern Division. Filed expert report October 12, 2011. Deposition November 10, 2011.
- Testifying expert in Vincent Torbio, et al. against Feldor Billiards Inc. D/B/A Fatcat Billiards, et al., Index No. 153384/14, Supreme Court of the State of New York, County of New York. Filed expert report May 29, 2018. Deposition July 24, 2018.

Selected Experience in Antitrust, General Damages, and Other Matters:

- Expert consultant in high-profile antitrust matters in the computer and credit card industries.
- Expert consultant for plaintiffs in re: Brand Name Drugs Litigation. Responsible for managing, maintaining and analyzing data totaling over one billion records in one of the largest antitrust cases ever filed in the Federal Courts.
- Served as neutral expert for mediator (Judge Daniel Weinstein) in allocating a settlement in an antitrust matter.
- Expert consultant in Seminole County and Martin County absentee ballot litigation during disputed presidential election of 2000.
- Expert consultant for sub-prime lending institution to determine effect of alternative loan amortization and late fee policies on over 20,000 customers of a sub-prime lending institution. Case settled favorably at trial immediately after the testifying expert presented an analysis I developed showing fundamental flaws in opposing experts calculations.

TEACHING EXPERIENCE:

KNOX COLLEGE, Teaching Assistant - Statistics, (1995)
KNOX COLLEGE, Tutor in Mathematics, (1992 - 1993)

PUBLICATIONS:

Coffman, Chad and Mary Gregson, “Railroad Construction and Land Value.” *Journal of Real Estate and Finance*, 16:2, pp. 191-204 (1998).

Coffman, Chad, Tara O’Neil, and Brian Starr, Ed. Richard D. Kahlenberg, “An Empirical Analysis of the Impact of Legacy Preferences on Alumni Giving at Top Universities,” *Affirmative Action for the Rich: Legacy Preferences in College Admissions*; pp. 101-121 (2010).

PROFESSIONAL AFFILIATIONS:

Associate Member CFA Society of Chicago
Associate Member CFA Institute
Phi Beta Kappa

AWARDS:

1994 Ford Fellowship Recipient for Summer Research.
1993 Arnold Prize for Best Research Proposal.
1995 Knox College Economics Department Award.

PERSONAL ACTIVITIES:

- Pro bono consulting for Cook County State’s Attorney’s Office.
- Pro bono consulting for Cook County Health & Hospitals System – Developed method for hospital to assess real-time patient level costs to assist in improving care for Cook County residents and prepare for implementation of Affordable Care Act.
- Pro bono consulting for Chicago Park District to analyze economic impact of park district assets and assist in developing strategic framework for decision-making.